

# SOUTHERN POWER AND INDUSTRY

MAY, 1955

NINTH ANNUAL  
PLANT MAINTENANCE  
ISSUE

Twenty Southern and Southwestern industrial, power and service plants report on plant-tested maintenance methods, procedures and techniques.



## Turbines and Boilers . . . . . 55

*Florida Power Corporation*

## Testing Aerial Cables . . . . . 58

*Dow Chemical's Texas plant*

## 2,000 Leaking Joints . . . . . 61

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## Where Does the Time Go? . . 73

*Answer from Georgia plant*

## Overhauling Outdoor Unit . . 74

*OG&E's three week job*

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# Get Both bearing features



**ALLIS-CHALMERS**  
**Totally-Enclosed**  
**Fan-Cooled**  
**MOTORS**

**fully enclosed and protected**

*...yet*

**easy to grease**

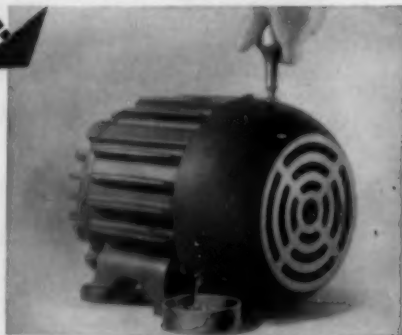
The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

You can lubricate the bearings without dismantling the motor. Pipe-tapped holes in the bearing housings at three points provide both means for inserting new grease and a means of flushing out old grease.

**Look for the extra bolts** on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4609



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Executive and Editorial Offices: 800 Peachtree St., N. E., Atlanta 5, Ga.  
Subscription Rates: United States and Possessions, \$1.00 per year or three years for \$2.50; Foreign Countries, \$15.00 per year.

Volume 73

Number 5





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# SOUTHERN POWER AND INDUSTRY

Vol. 73  
No. 5

MAY  
1955

NBP



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Annual Subscription—\$1.00  
Foreign—\$10.00

Published monthly by  
W. R. C. SMITH PUB. CO.  
Atlanta, Ga., and Philadelphia, Pa.

Publishers also of *Textile Industries*, *Electrical  
South*, *Southern Hardware*, *Southern Automotive  
Journal*, *Southern Building Supplies*, and *South-  
ern Appliances*.

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Contents indexed regularly by Engineering Index, Inc.

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Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA

# *Facts and Trends*

## FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

May, 1955

- **THIS IS SP&I's 9th Annual PLANT MAINTENANCE ISSUE** presenting "plant-tested" procedures to reduce maintenance costs, save materials and improve operations. Following the pattern established in past years, this issue does NOT DEAL WITH THE SPECTACULAR. All case studies reported are actual, PROVEN PROCEDURES in Southern and Southwestern industrial, power and large service plants where they are employed.

Few readers will find it profitable to study every article--but if you will spin the pages of this issue, and read the titles and subtitles, you are sure to find one, two--or a dozen ideas that will help you improve maintenance in your own plant.

- **PREVENTIVE MAINTENANCE** pays off at Southwestern Gas and Electric Company plants. The Arsenal Hill station was the main steam-electric plant for the company system from 1926 to 1952. The plant reached its peak during World War II when it was run for 33 consecutive months with a CAPACITY FACTOR OF 109%. Company engineers correctly conclude that this excellent service record is due to an effective preventive maintenance schedule and good workmanship. (See page 62.)

- **HIGH VOLTAGE D-C TESTING** is reported to be of considerable value at Dow Chemical Company's Freeport, Texas operations for the acceptance testing of new cables and routine testing of older cables. By means of this testing, plant distribution engineers have found cable and termination defects that were repaired during planned shutdowns. Had these defects not been found they could have caused power failures that would have been more difficult to repair and could have been very expensive due to loss of production.

Total power requirement for Dow's Freeport and Velasco, Texas, plants is about 500,000 kw. This power is generated at Dow power plants and distributed by a 15 kv power distribution system employing aerial cables. The cables, with only several exceptions, are varnished cambric insulated, non-metallic sheathed, protected with bronze interlocked armor overall. In this issue of SP&I, Dow Chemical Company plant maintenance men report on experiences with high voltage direct current testing of the aerial cables, and methods used to locate cable faults. (See page 58.)

- **ATTENTION! ALL WELDERS!**--Be on the watch for the GOLD RODS in your shipments of Eutectic Welding Alloys Corporation's "Low Temperature Welding Alloys." Between April 1st and November 1st, 1955, five welders will find a special "Gold" rod or electrode in their shipments.

One special gold rod represents the 1 billionth "rod" produced by Eutectic during its first fifteen years; and the welder who returns it to his Eutectic District Engineer will receive a \$100 award. The four other "gold" rods symbolize the company's 15th Anniversary; and these will each win a \$50 award. For details check SP&I for April, 1955, page 114.

- **BIG NUCLEAR POWER EQUIPMENT** manufacturing plants are now under construction in Virginia and Tennessee. Babcock & Wilcox Company's 100,000 sq ft atomic energy division plant near Lynchburg, Virginia, is expected to be completed by the end of the year. The new Combustion

(Continued on page 6)





**SPANG<sup>®</sup> CW STEEL PIPE**

gives top-flight service

**SPANG<sup>®</sup> CW**

## at Charlotte Municipal Airport

Owner: The City of Charlotte, N.C.  
 Architect: Walter Hook and Associates, Inc., Charlotte, N.C.  
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The citizens of Charlotte, North Carolina, are proud of their \$2,000,000 Municipal Airport. Five years ago the plans were started for this airport. Three years later the construction began. In the span of those two years, the air travel and freight into Charlotte increased beyond all expectations, and authorities knew that the size and capacity of the building and runways as originally planned were totally inadequate.

To meet the new demands, the final expenditure totaled more than four times the original estimate. Now in full operation, Charlotte Municipal Airport offers *top-flight* service and comfort to passengers and visitors.

To provide *top-flight* service for fire mains, roof drains and gas, vent and water lines, 15 tons of *top-quality* SPANG CW Steel Pipe were installed in the three-story airport building. The contractors on this job knew they could depend on the quality and service of SPANG, because SPANG pipe is *quality-controlled* from the skelp to the finished pipe.

Careful selection of top-grade skelp . . . close control during forming and welding . . . complete testing and inspecting assures you of *top-quality* pipe—pipe that's easy to bend, cut, thread and weld. That's why SPANG CW can give you faster installations and save you money on the job. That's why so many contractors and

builders consistently specify SPANG CW Steel Pipe.

Why not let SPANG CW give you *top-flight* service? See your nearest SPANG distributor for your next order of pipe.

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DIVISION OF THE NATIONAL SUPPLY COMPANY  
 General Sales Office: Two Gateway Center, Pittsburgh, Pa.  
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## Facts and trends (continued from page 4)

Engineering plant scheduled for Chattanooga, Tennessee, is a major part of the recently announced \$7 million long-term expansion program of the company.

- **ARE THEY PICKING YOUR POCKET?** When your maintenance costs climb out of line, investigation usually reveals that a very few, very troublesome machines are causing the rise. A maintenance program that provides for a regular check of individual machines can pick out these trouble-makers before they pick your pocket.

Such a program was recently instituted at Temco Aircraft plant in Dallas, Texas. It requires that maintenance men take time once a year to consider each piece of equipment. They count the number of work orders issued against it; total the maintenance man hours spent on it, and add the cost of labor and materials its upkeep has required.

Then they figure what percentage of the machine's original cost they have spent on its maintenance in a 12-months' period. A high percentage here doesn't necessarily label the machine as excessively expensive. But it certainly gives them an indication of where to start looking for trouble. C. G. Housewright, superintendent of maintenance at Temco Aircraft, reports on the details of the system in this issue of SP&I. (See page 78.)

- **FLUID COKE WILL BE USED FOR FUEL** in the power plant of the new 130,000 barrel Delaware refinery of the Tide Water Associated Oil Company. Riley Stoker Corporation pulverizers will prepare the coke (by-product of the refining process) for burning in three Riley steam generating units. These will have a rated capacity of 500,000 lb/hr at temperatures of 950 F and at 1425 psig. Plant is expected to be on stream late in 1956.

- **2,000 LEAKING JOINTS** in a huge 750 ton sheet and extrusion press recently confronted Convair maintenance engineers at Fort Worth, Texas. Hydraulic hammer caused leakage throughout the piping system. The pipes had been filled with oil, which had penetrated all the joints. To completely clean in place seemed impossible. To disassemble and replace would take three months and cost thousands of dollars.

Plant engineers decided to braze the joints with low temperature brazing alloy. Entire piping system was drained and then filled with Argon gas without any cleaning. No scale was formed, and the braze metal made a complete bond with both pipe and fitting. Some 1500-2000 joints were brazed, requiring 6 weeks time and 2400 man hours. Engineers conservatively estimate a 50% cost saving for the job as compared with the replacement of the piping system. (See page 61.)

- **INDUSTRIAL PAINTERS SCHOOL**--Ever hear of a school for the man-with-the-brush? At Carbide and Carbon Chemicals in Texas City, Texas, maintenance engineers, union representatives and paint manufacturers organized and held a very successful 8-session school for all industrial painters in the Texas City area.

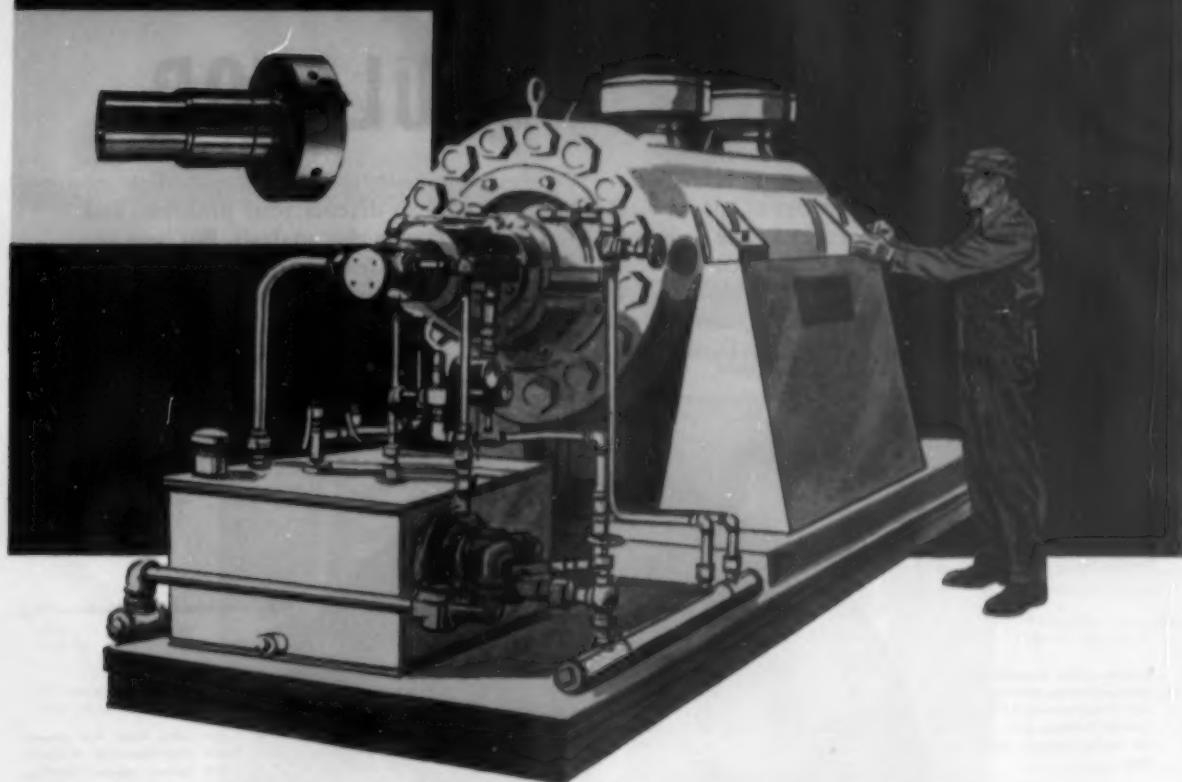
Class schedule called for meetings on surface preparation; application equipment; primers; Vinyl paints and mastics; Neoprene protections and Chlorinated Rubber paints; Alkyd paints, cold galvanizing processes and Phenolic coatings; hot application of paint, use and application of mastics; and safety, inspection, and costs.

Carbide and Carbon maintenance engineers believe that the school has not only raised the level of craftsmanship of those attending, but has brought about a better understanding of the problems that confront people concerned with industrial painting. Details of the entire program are outlined in SP&I for April, page 70.

---

Write the editors for additional information on any of the above items.  
SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

# Now... **BJ** mechanical seals for high pressure boiler feed pumps!



## **Another Byron Jackson first!**

- **No operating adjustment**
- **Stop liquid loss**
- **Reduce heat loss**
- **Save downtime costs**
- **Cut replacement costs**

BJ... the pacemaker in mechanical seals for pumps ... now has pioneered the first successful application of the mechanical seal to high pressure boiler feed pumps. These new BJ Mechanical Seals are now in operation in a number of high pressure, hot water pumping operations, including temperature up to 430° F. These seals—some in service as long as three years—have paid off in performance. They have

minimized heat and liquid loss, eliminated frequent repacking problems, and simplified maintenance since no operating adjustment is required. Find out how these new BJ Mechanical Seals for boiler feed pump service can benefit you. Contact your nearby Byron Jackson office or write.

You'll do better with

# **BJ**

## **Byron Jackson Co.**

*Since 1872*

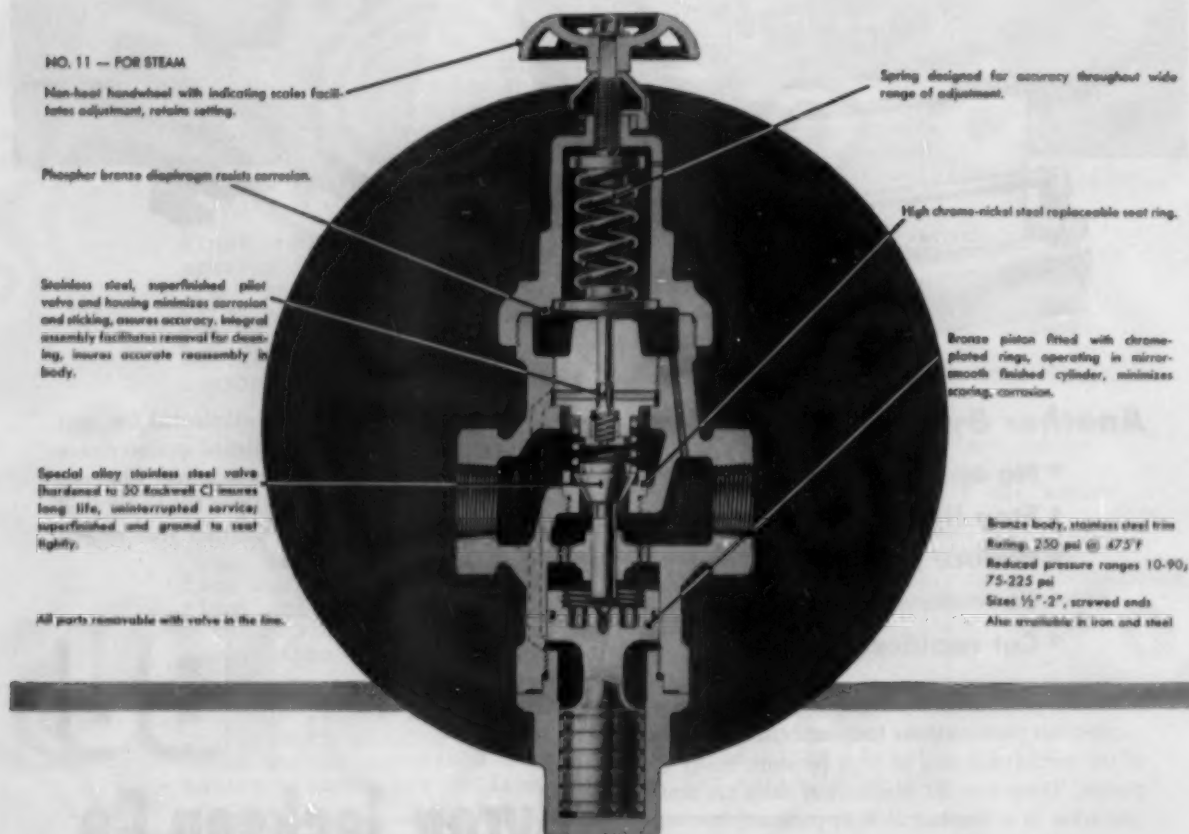
P. O. BOX 2017, TERMINAL ANNEX, LOS ANGELES 54, CALIFORNIA



## Some Quick Tips from Mason-Neilan on **SELECTING A PRESSURE REGULATOR**

The best regulating valve for any specific application is the one that meets your accuracy requirements, fits the operating conditions, and gives you the lowest combination of maintenance and initial costs. Mason-Neilan engineers or your Mason-Neilan Distributor

will be glad to discuss your problem, and help you to make this analysis. But here are some important features you should know and look for that will help you to make your own selection.



**No. 11 — For Steam**



NO. 227 — FOR WATER  
Easy setting of reduced pressure

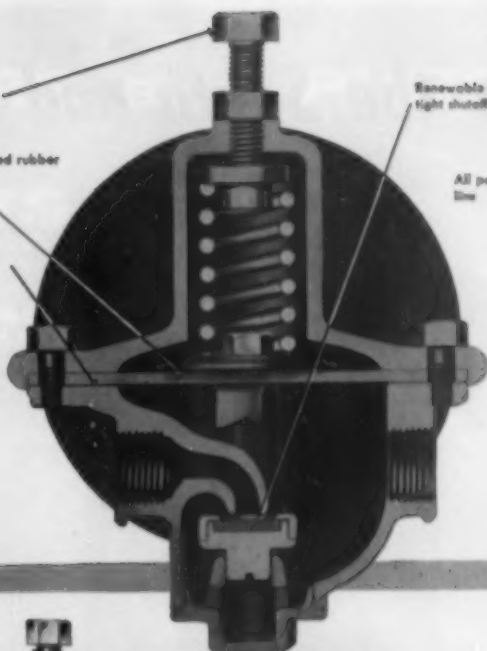
Heavy-duty fabric reinforced rubber diaphragm

Sturdy bronze body resists corrosion

Renewable composition disc valve insures tight shutoff

All parts removable with valve in the line

Bronze body, screwed ends  
Rating: 150 psi @ 100°F  
Reduced pressure ranges: between 10 and 60 psi  
Size: 1/4"-2"



NO. 33 — FOR SMALL STEAM LINES

Easy setting of reduced pressure

Long spring for wide range of adjustment

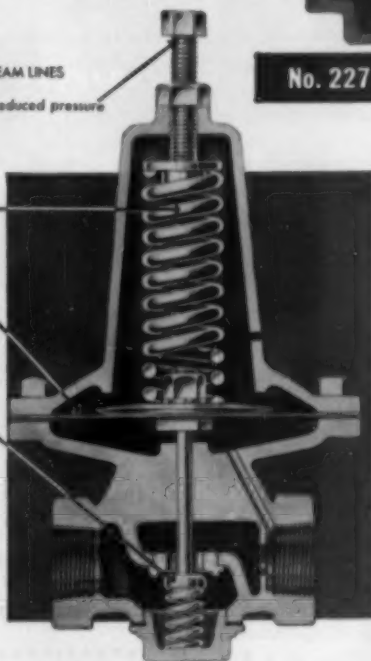
Metal diaphragm resists corrosive effect of steam

Stainless steel valve plug and seat ring for long life

All parts removable with valve in the line

Bronze body, stainless steel trim  
Rating: 200 psi @ 400°F

Reduced pressure ranges: 2-20; 20-60; 60-100 psi  
Size: 1/4"-1/2" NPT



No. 227 — For Water

NO. 71 FOR AIR

Easy setting of reduced pressure

Range spring treated for corrosion resistance

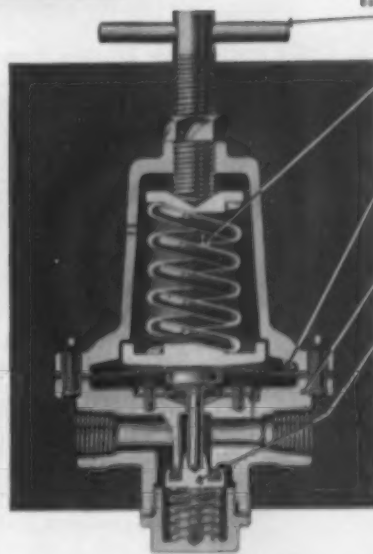
Diaphragm sized for sensitive response, nylon reinforced for strength

Rugged forged brass body (supplied with gauge)

Replaceable composition disc for tight shutoff

All parts removable with valve in line

Bronze body  
Rating: 250 psi inlet pressure  
Reduced pressure ranges: 3-60; 60-100 psi  
Size: 1/4"-1/2"  
Available also with integral filter (NO. 72)



No. 33 — For Small Steam Lines

No. 71 — For Air

ALL HIGH



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New Orleans • Dallas • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

# NEWS for the South and Southwest

## Trion Appoints Merrill South-Central Sales Mgr.

TRION, INC., 1000 Island Avenue, McKees Rocks, Pa., announces the appointment of L. TODD MERRILL as regional sales manager for its South-Central territory comprised of Southern Illinois, Western Tennessee, Mississippi, Missouri, Kansas, Oklahoma, Texas, Louisiana and Arkansas. The new regional office will be located in the Manufacturers' Interchange, 4924 Greenville Avenue, DALLAS 6, TEXAS.

Mr. Merrill has been closely affiliated with air conditioning, electronics, and aeronautical engineering firms in Dallas; in addition, he operated his own sales counseling and public relations firm in Dallas for some years.

Trion, Inc. designs and manufactures electronic air cleaners, which remove airborne dirt by electrostatic precipitation. The company also manufactures mechanical type air filters.

## Dowell Announces New Southeastern Appointments

DOWELL INCORPORATED, TULSA, OKLAHOMA, has made several changes in personnel and duties in its NEW ORLEANS, LOUISIANA district. The principal service offered by Dowell is chemical removal of scale and sludge deposits in heat exchange equipment in industrial plants.



E. W. Hudgens and A. C. Shoults

E. W. HUDGENS, formerly an area sales engineer in New Jersey, is now district sales engineer with headquarters in New Orleans.

A. C. SHOULTS, formerly service engineer at Anniston, Alabama, is now sales engineer at HATTIESBURG, MIS-

SISSIPPI, and is responsible for sales in the center of the New Orleans district, including Mississippi and parts of Alabama, Florida, and Tennessee.



O. W. Bosworth and B. P. Robinson

O. W. BOSWORTH, sales engineer at ANNISTON, ALABAMA, is responsible for all sales in eastern Tennessee and western Georgia. J. S. THOMAS, formerly service engineer at Midland, Texas, is now service engineer at Anniston.

B. P. ROBINSON, former technical development engineer in the company's general office in Tulsa, is now sales engineer in the New Orleans district office.

## Atlantic Steel Lets Contracts for New Mill

ATLANTIC STEEL COMPANY has announced that contracts have been awarded for the construction of a new merchant bar and rod mill.

According to J. H. Girdler, company vice-president in charge of operations, this mill is the first phase of a \$10 million modernization and improvement program recently approved by the company's stockholders. Grading for the mill by Dalon Construction Company, Atlanta, is nearly completed.

General engineer for the construction of the buildings and installation of the new mill is Rust Engineering Company, Birmingham. The mill itself will be housed in a building 740 ft long by 100 ft wide. Two warehouses attached to the main building will occupy an additional 52,000 sq ft of space.

Mill machinery for the 21-stand combination bar and rod mill is being

built by Morgan Construction Company, Worcester, Mass.

Contracts for the electrical machinery, equipment and installation were awarded to General Electric Company.

Rust Furnace Company, Pittsburgh, received the contract for the reheating furnace, and four overhead cranes for the mill and warehouses will be supplied by the Whiting Company, Harvey, Ill.

Actual construction of the buildings is scheduled to start in May, and installation of the mill machinery and electrical equipment will begin about October. The mill is expected to be completed and in operation by September, 1956.

The total amount involved in these contracts is approximately \$8½ million.

## Lindberg—Texas & Louisiana

R. K. RAWLINS who has been on the Chicago sales staff of LINDBERG ENGINEERING COMPANY for several years, has been appointed district manager with offices in Dallas and will direct sales activities in the TEXAS-LOUISIANA area. He succeeds WILLIAM A. HAMMER who has resigned to join Dominy Heat Treating Corporation, Dallas.

(More News — Page 125)

## FUTURE EVENTS Of Engineering Interest

**INTERNATIONAL OIL EXPOSITION.** Duane Ellis, Pres., 1416 Melrose Bldg., Houston, Texas.

May 3-8, Exposition, Sam Houston Coliseum, Houston, Texas.

**NATIONAL MATERIALS HANDLING EXPOSITION.** Clapp & Pollak, Inc., 341 Madison Ave., New York 17 N. Y.

May 16-20, Exposition, International Amphitheatre, Chicago, Ill.

**INDUSTRIAL MARKETING ASSOCIATES INC.** John Paul Taylor, Exec. Sec'y, 525 Pleasant St., St. Joseph, Mich.

May 22-26, Annual Meeting, The Cloister, Sea Island, Georgia.

**AMERICAN WELDING SOCIETY.** J. G. McGrath, Sec'y, 33 West 39th St., New York 18, N. Y.

June 7-10, National Spring Meeting, Hotel Muehlebach, Kansas City, Mo.

# WELDERS and PURCHASING AGENTS ARE GRABBING HOLD

of

the new  
**U. S. ROYAL Gold Fluted**  
**Welding Cable**

## HERE'S WHAT WELDERS SAY:

"Easier to handle. It's so light and flexible I don't get the usual 'drag.' A cinch to handle in cramped quarters."

"I get easier grip. The *fluted* jacket does it. U. S. Royal Gold coils easily, resists kinks and tangles."

"Easier to see because of the bright yellow color. I don't trip over it. And I can easily tell it from the black cable whenever I have to use *two* cables on the machine."

"The *fluted* jacket has a greater surface area. That makes the cable cooler to handle, because heat is dissipated quicker."

WRITE ADDRESS BELOW FOR FREE FOLDER  
that gives facts demonstrating the superiority  
of U. S. Royal Gold Fluted Welding Cable.



**UNITED STATES RUBBER COMPANY**

Electrical Wire and Cable Department • Rockefeller Center, New York 20, New York.

## HERE'S WHAT PURCHASING AGENTS SAY:

"**Longer service life.** U. S. Royal Gold is so flexible we get fewer failures at terminal connections. Maintenance costs go down, replacements are few and far between."

"**Superior impact resistance.** Tests show that U. S. Royal Gold Welding Cable possesses greater resistance to impact than conventional constructions. It shows up on my cost sheets."

"**Lower accident insurance charges.** U. S. Royal's bright yellow color catches everyone's eye. It also keeps workmen from running vehicles over it or letting equipment drop on it. Result: U. S. Royal Gold lasts even longer."

"**It has high resistance to moisture**—thanks to its 60% natural rubber jacket and its 60% natural rubber insulation."

Made exclusively by United States Rubber Company and available at your electrical supply house.



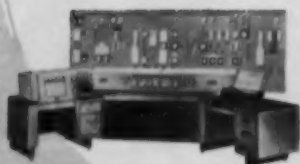
## PANELLIT INFORMATION SYSTEMS



**PUT**



**YOU**



**IN**

Panellit has made the complete Information System available now as a management tool for increasing dollar yield from present processes.

With the Information System, you achieve complete, centralized control of your entire plant.

You know instantly and continuously overall performance of your process. You know immediately of a process fault . . . where and how to correct it. You know continuously your process trends and yields, statistically analyzed and ready for management evaluation.

Panellit alone provides all the essential control features today:

**Automatic Logging . . .** at pre-determined intervals or "on-demand" . . . complete Panellit systems for over 3000 variables have been in successful operation for years.

**A Usable Log Form . . .** arranged by processing units . . . a practical aid to the operator for control and determination of process trends.

**Continuous Monitoring . . .** of all variables with an audio-visual signal plus immediate red-print, "off-normal" readout.

**Individual Off-Normal Settings . . .** for each point; separate "high" and "low" settings . . . a true guide for operation.

**Direct Accounting or Computation . . .** data may be fed directly, without human translation, to calculators for automatic accounting or computers for "on-the-spot" efficiency and yield determinations.

**Flexibility in Application . . .** capable of handling all conventional input signals: AC or DC, either linear or non-linear.

**Complete Systems Engineering . . .** with impartial selection of instruments and controllers for entire control room.

## COMPLETE CONTROL



Alarm and Safety Division



Scanning and Data-Reduction Division

## PANELLIT, Inc.

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Skokie, Illinois



# Preferred for Precision and Performance



FIG. 19084—  
900-Pound Steel  
Pressure Seal  
Non-Return  
Globe Valve,  
Gear Operated.

Powell Valves are the choice of engineers because they know every valve is precision made, meeting every specification—every time.

And there are other good reasons why engineers prefer Powell Valves—because Powell Valves are dependable . . . economical . . . and Powell has the COMPLETE quality line of valves.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our complete line, and help solve any flow control problem you may have.

The Wm. Powell Company 109<sup>th</sup> year  
Cincinnati 22, Ohio...

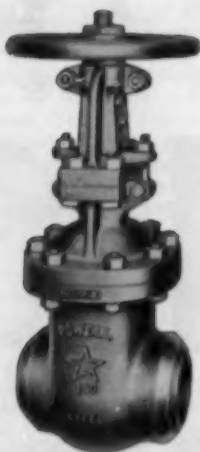


FIG. 1503WE—150-Pound  
Steel Gate Valve.



FIG. 11323—1500-Pound Motor Operated  
Steel Pressure Seal Gate Valve.

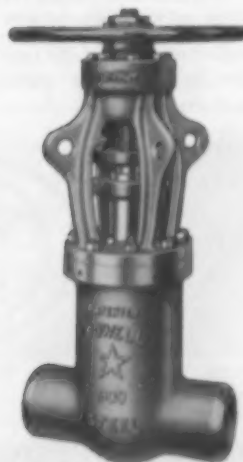


FIG. 19003—900-Pound Steel  
Pressure Seal Gate Valve.

# POWELL VALVES



Garlock 150  
High Pressure  
Steam Packing



Garlock 234  
ROTOPAC Rotary  
Pump Packing



Garlock 117  
Valve Stem  
Packing



Garlock 777  
Low Pressure  
Packing



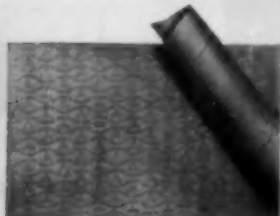
Garlock 202  
Special Hydraulic  
Packing



Garlock 730  
LATTICE BRAID\*  
Asbestos Packing



Garlock 430  
CHEVRON\*  
Hydraulic Packing



Garlock 900  
Compressed Asbestos  
Sheet Packing

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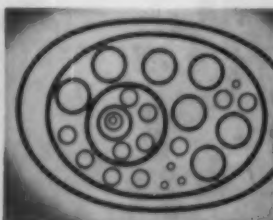
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Packings and  
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Garlock 631  
Twisted Lead  
Foil Packing



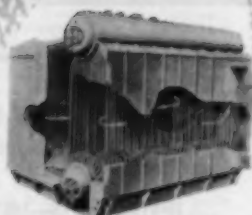
Garlock MECHANIPAK  
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Rotary Shafts



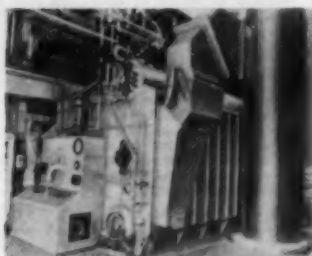
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Floating Metal  
Packing

now... Combustion's VP Boiler with a

# NEW LOOK



Cutaway view showing arrangement of two-pass VP Boiler.



Industrial installation of VP Boiler in the South. Capacity — 33,000 lb steam per hr, design pressure 250 psi.

*gives you  
more steam  
.....  
per dollar!  
.....*

**THE VP BOILER is available in capacities ranging from about 4,000 to 40,000 lbs of steam per hr, and pressures up to 500 psi.**

Combustion's well-known C-E Package Boiler, Type VP, has a new look ... outside and inside! Outside. The VP's exterior is more streamlined, more compact. The controls and fan are now an integral part of the boiler front. Duct work is simplified. This means better appearance, easier maintenance, better operation.

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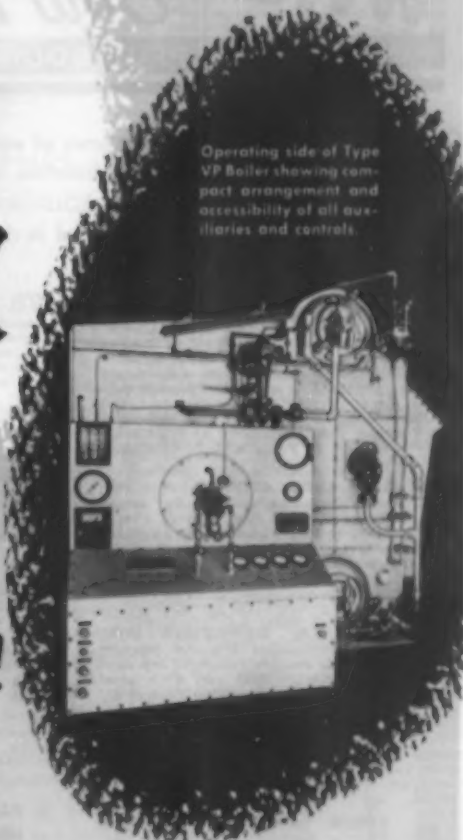
All of the existing extra features which contributed to the enthusiastic acceptance of the original VP design remain. Briefly summarized they are:

- More water cooling per unit of furnace volume than any other boiler of the VP's size and type.

- Quiet centrifugal fan, which operates at low speed and with an exceptionally low noise level.
- Large lower drum, which facilitates handling wide load swings ... permits a simple, symmetrical tube arrangement ... simplifies inspection.
- Single Burner assures balanced furnace conditions and air distribution ... is easier to operate and to maintain ... simple burner control equipment ... no air leakage through idle burner ... change oil gun, when required, in seconds.
- Simple baffle arrangement, which means maximum heat transfer rate ... no dead gas pockets ... simplified soot blowing.

The New VP Boiler not only looks more attractive but it is functionally improved and stands ready to deliver more steam per dollar.

Write, today, for complete information. Ask for new catalog VP-146 (just off the press) which contains specifications and general information on dimensions, space requirements, construction details and controls.



Operating side of Type VP Boiler showing compact arrangement and accessibility of all auxiliaries and controls.

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620	623	636	657	694	706	764	766	787	815	826	831	833	848	935	956	960
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620	623	636	657	694	706	764	766	787	815	826	831	833	848	935	956	960
969	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	Q-10	Q-11	Q-12	Q-13	Q-14	Q-15	
Q-16	Q-17	Q-18	Q-19	Q-20	Q-21	Q-22	Q-23	Q-24	Q-25							

Also send further information on following New Equipment (page 104)

E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9	E-10	E-11	E-12	E-13	E-14	E-15	E-16
E-17	E-18	E-19	E-22	E-23	E-24	E-25	E-26	E-27	E-28	E-29	E-30	E-31			

Name ..... Position .....

Company Name .....

Street .....

City ..... Zone ..... State .....



### BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 582, SEC. 24.9, P. L. & R., ATLANTA, GA.

Equipment and Review Editor  
SOUTHERN POWER AND INDUSTRY  
806 Peachtree St., N. E.  
Atlanta 5, Ga.

List Items You Want,  
Tear Out and Mail  
One of the  
Attached Cards  
Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.



## NEWS! SELF-CLEARING ASH HANDLING SYSTEM

with

3

exclusive

features!

What the jet plane did to the ox-cart, A-S-H has done to Pneumatic Ash Handling Systems. There's no clogging—no plugging—long wear—with the new Ceramic Throat, Improved Vacuum Breakers, Materials Handling Valves and other important features.

Completely new Ceramic Throated Steam Jet wears far longer than jets made of conventional materials—assures continued high efficiency with minimum steam consumption.

Newly designed, self-feeding Materials Handling Valves feed continuously into the system commensurate with the rate of air flow. There's no overfeeding or plugging of system.

Automatically operated Vacuum Breaker Valves assure a clean sweep of all risers in each dump cycle.

A-S-H Steam Jet Ash Handling Systems bring to the small boiler plant pneumatic ash handling at its best. Every A-S-H system is the product of long engineering experience, precise and practical design, skillful workmanship. For complete technical data on A-S-H Steam Jet Pneumatic Ash Handling Systems, send to Dept. A2 for Data Sheet Za.

The **Allen-Sherman-Hoff** Company

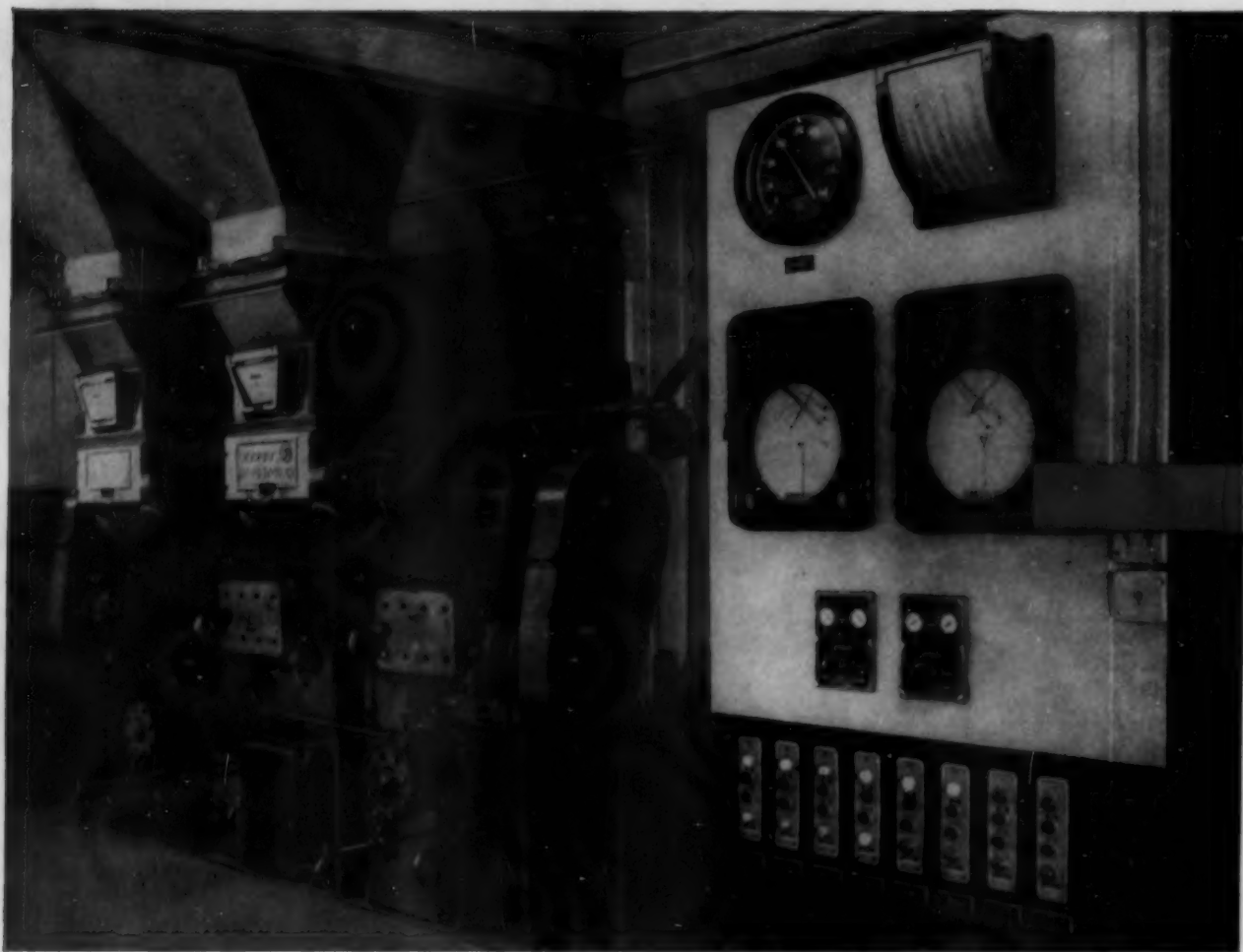
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**MATERIALS HANDLING SYSTEMS**

hydrojet hydraulic / hydrovac pneumatic



B&W Integral-Furnace Boiler with its control panel at Mill No. 3 boiler plant of Highland Park Manufacturing Company. Presently coal-fired with Detroit RotoStoker, the boiler is designed for future

oil and gas firing. B. O. Vannort Engineers, Inc., are the consulting engineers for this installation.

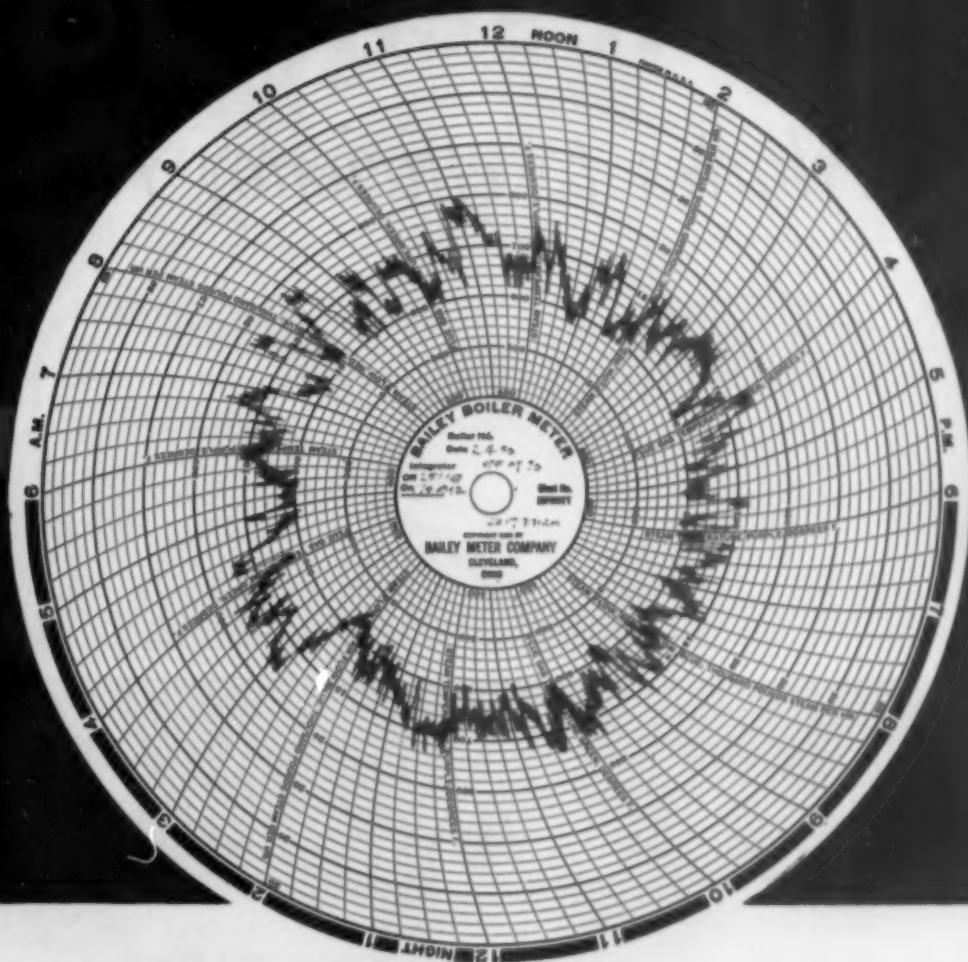
## HIGHLAND PARK MANUFACTURING COMPANY

# **Saves 20% on** **with a B&W Integral-Furnace Boiler**

When a study of boiler plant costs confirmed that boiler and auxiliary facilities at Highland Park Manufacturing Company's Mill No. 3, were inadequate and costly, a B&W Integral-Furnace Boiler was installed to replace one of the two old steam units in the plant. Other charges and replacements, including steam piping and ducts and a coal-handling system, were made at the same time. And from the day the new equipment went into operation the boiler plant started to pay for itself. An indication of actual savings is shown by the 706-ton annual reduction in fuel consumption—a full 20 per cent saving and in itself strong justification for the plant's modernization.

The new B&W Boiler provides 25,000 lb of steam per hr, and 27,500 lb per hr to meet peak loads. Designed for a pressure of 250 psi, the boiler is currently being operated at about 150 psi. Coal-fired, it has provision for future installation of oil- and gas-firing equipment without disturbing the stokers, to derive full benefit from fuel price fluctuations. Also, this new unit assures a constant and reliable steam supply with quick response to the wide load swings common in the course of normal operation. It is equipped with complete controls, an alarm system and other protective devices to minimize manual operation and supervision. In addition to fuel savings, the Company reports overall





# Fuel Alone

boiler efficiency consistently high, the plant much cleaner than before, and maintenance costs reduced substantially.

Highland Park Manufacturing Company and many other industrial plants in various categories have found B&W Integral-Furnace Boilers ideally suited to their steam requirements. If you are considering steam plant modernization or expansion to improve efficiency, get full details concerning B&W Integral-Furnace Boilers, available for steam requirements from 2900 to 350,000 lb per hr. Write to The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

## COST-SAVING FEATURES

- Minimum floor space and headroom requirements
- High fuel economy
- Smokeless combustion
- Adaptable to all fuels and firing methods
- Economical fast steaming
- Water-cooled furnace
- Clean, dry steam at all ratings, even with high boiler water concentration
- Quick response to wide and heavy load swing demands
- Easy to inspect and clean
- High availability with least attention

**BABCOCK  
& WILCOX**



BOILER  
DIVISION

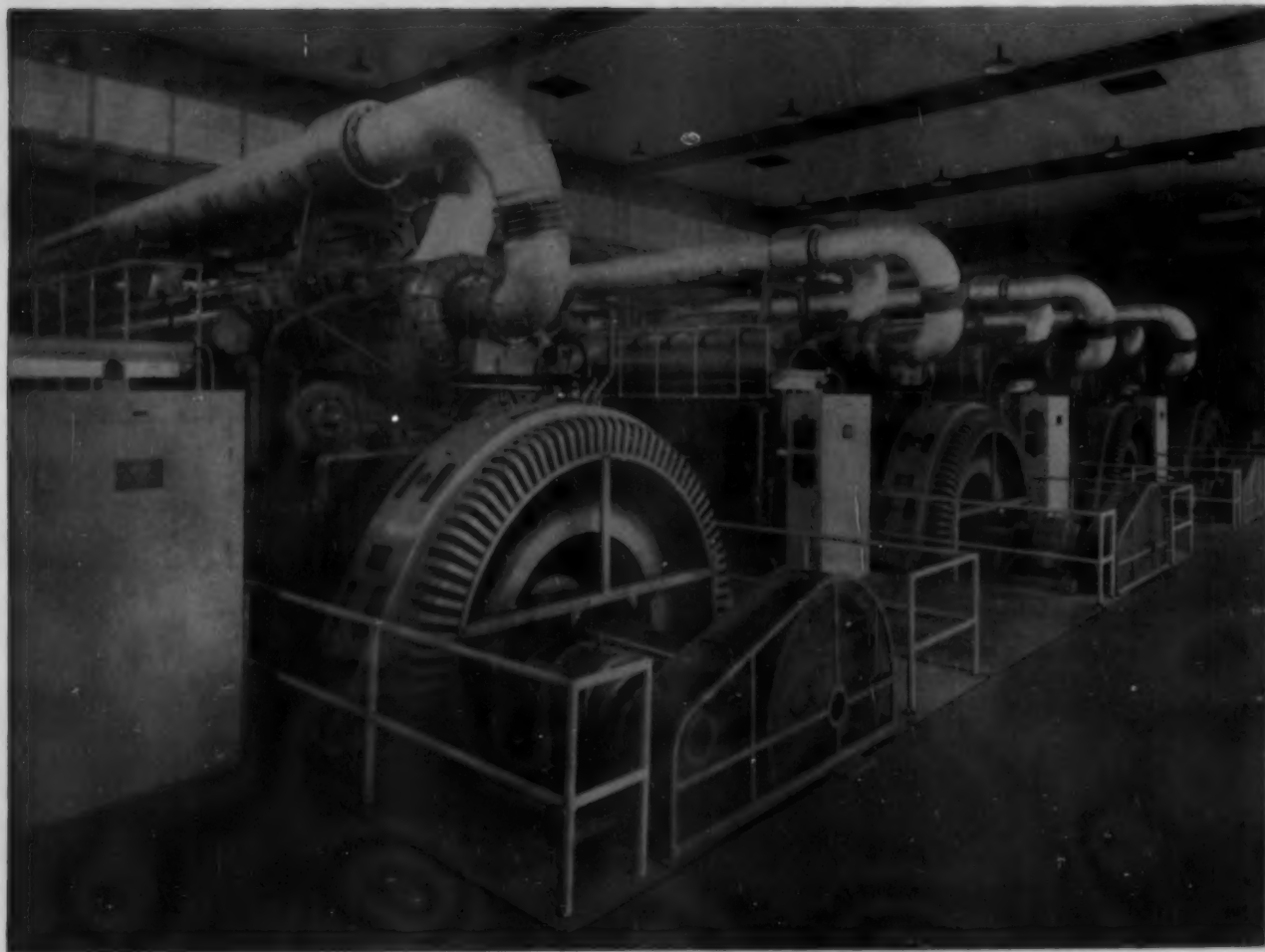
G-707

# Gulf Dieselmotive

*contributes to efficiency record*

Modern office building and plant of the M & A Electric Power Cooperative, Poplar Bluff, Missouri, winner of the 1954 Diesel Progress Efficiency Award.

Gulf Dieselmotive Oil provides the vital lubrication for these four Cooper-Bessemer 16-cylinder Diesels in the M & A Plant.



# Oil

## *at award-winning Diesel plant*



The M & A Electric Power Cooperative of Poplar Bluff, Missouri, has been named winner of the 1954 Diesel Progress award for the most efficiently operated REA internal combustion plant.

Gulf Dieselmotive Oil provides the kind of lubrication necessary for such an award-winning performance! This modern Diesel lubricant protects the four Cooper-Bessemer 16-cylinder Diesel engines in the M & A Plant against excessive wear, and contributes to efficient operation and lower maintenance costs.

*Here's why:*

1. Effective detergent action prevents

harmful piston ring belt deposits.

2. Base stocks are selected for their ability to help prevent hard deposits on the piston crown and in the ring belt area.

3. 100% solvent refining (removing undesirable constituents) insures greater stability and better bearing protection.

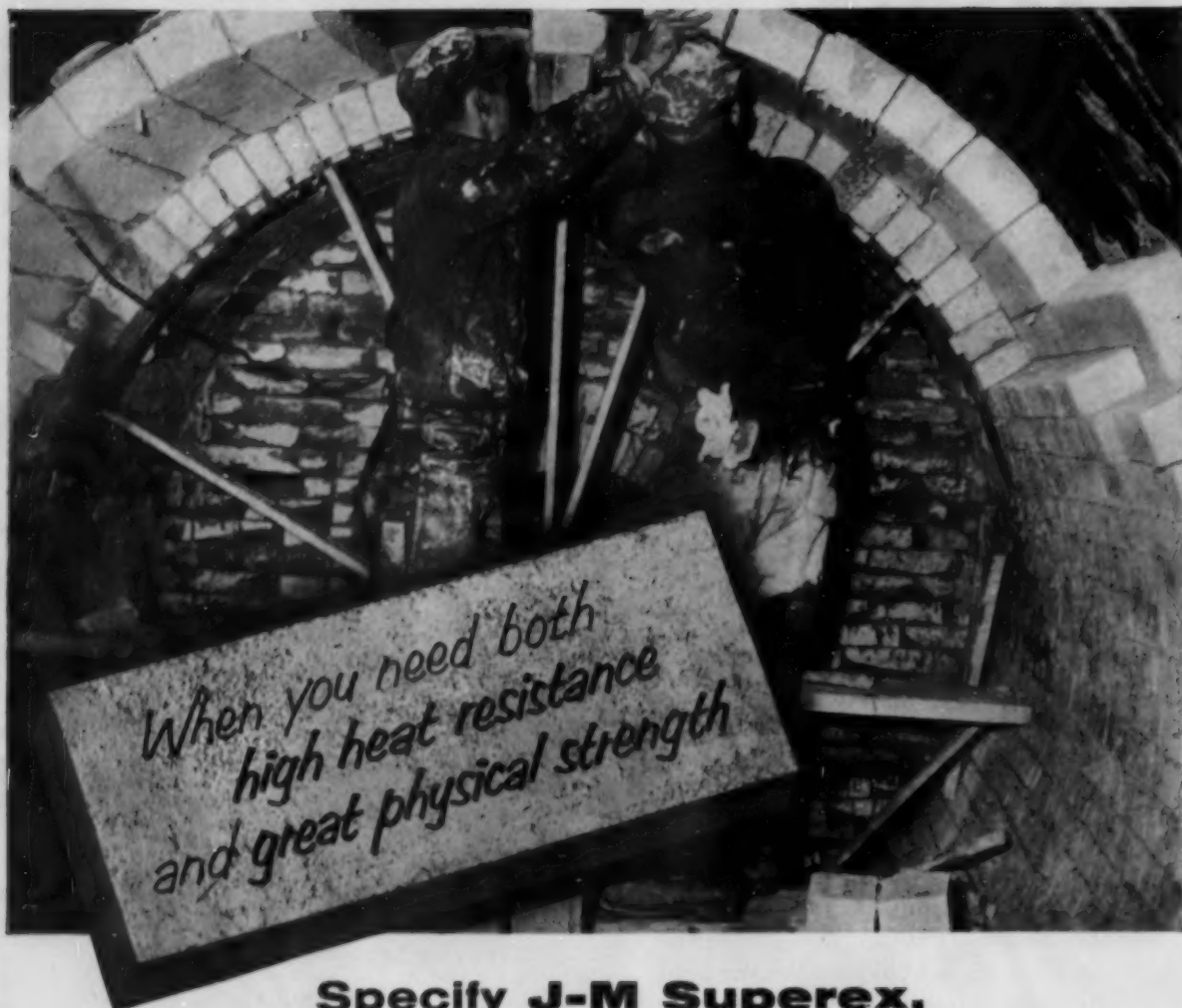
Investigate the operating savings possible with Gulf Dieselmotive Oil in your Diesels. Contact your nearest Gulf office today and have a Gulf Sales Engineer recommend the proper grade.

**GULF OIL CORPORATION • GULF REFINING COMPANY**

1822 Gulf Building, Pittsburgh 30, Pa.



**THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS**



## Specify J-M Superex, Industry's favorite block insulation

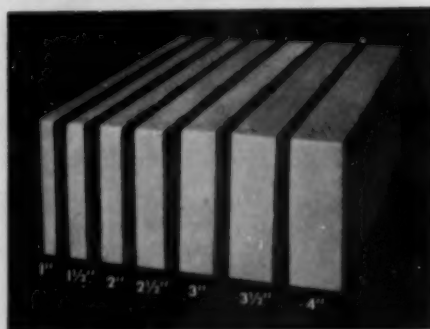
**Made from diatomaceous silica and asbestos  
for all temperatures to 1900F**

**YOU'LL ENJOY** greater insulation savings with Superex®. Its unique combination of low conductivity and outstanding resistance to high temperatures provides greater operating efficiency and longer maintenance-free service. That's why Superex is the leading block insulation for furnace work.

**Light and easy to work.** Superex withstands temperatures to 1900F indefinitely with negligible loss of efficiency and is so strong that it compresses only 1/4 inch under 6 tons' pressure per square foot. Its light weight, excellent working properties and availability in

large blocks mean quick, easy, low-cost installation.

**For high temperature equipment.** Since its introduction in 1927, Superex has received enthusiastic acceptance. Today it economically insulates 90% of the country's hot blast stoves. Other high temperature equipment where Superex has proved its superior performance include most types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, regenerators, kilns, roasters, high-temperature mains, flues and stacks.



**Saves waste**—Superex comes in 7 standard thicknesses from 1" to 4". Other sizes available on order.

For further information on Superex, write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.



**Johns-Manville** *first-in* **INSULATION**  
MATERIALS · ENGINEERING · APPLICATION



# DETROIT ROTOSTOKERS SATISFY



*Write for this reprint today*

*This article should interest you.*

It tells how the Chesterfield Richmond plant was modernized. A Detroit Roto-Stoker fired Babcock and Wilcox Integral-Furnace boiler increased the steam-coal rate from 7.6 to 11.7.

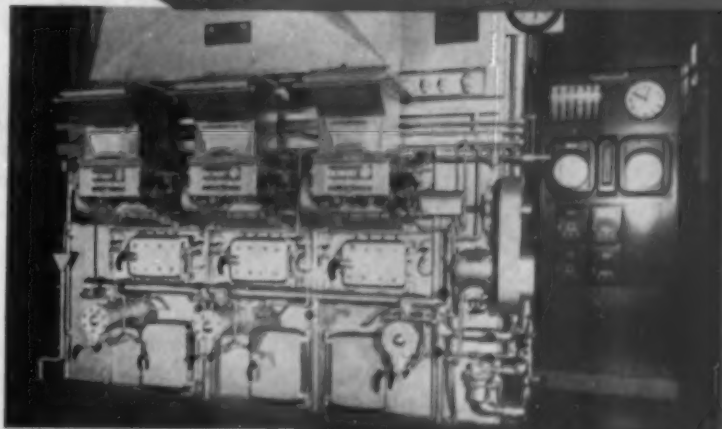
Detroit RotoStokers will save you money. Contact our nearest district office or your consulting engineer.



*"They Satisfy"*

**Detroit RotoStoker at Liggett  
& Myers Tobacco Company  
Richmond, Virginia Plant**

**Lockwood Greene  
Engineers Inc.  
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## DETROIT STOKER COMPANY

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**DETROIT  
SINCE 1898  
STOKERS**



*What's in it for you?*



ONE OF THE KEYS to safer handling of your freight shipments is inside this new Southern Railway freight claim prevention car.

For here is a completely equipped "theater-on-wheels," with a 60-seat auditorium, a projection room for both motion pictures and slides, a radio, record players and tape recorder. Designed to "set up shop" any place along our lines, the unit is completely self-contained, with its own power generator, heating and air conditioning system.

Our yard crews and people who work in freight transfers will share in this new educational program at various points on the Southern. This new weapon in our never-ending fight against freight damage will help give your freight a *safer* ride on the Southern! **SOUTHERN RAILWAY SYSTEM**

# For easier and better pipe hanging!

This adjustable swivel hanger attached to a concrete insert is easy to install and will safely carry a wide range of loads. Like all Grinnell Hangers, it permits easy adjustment at any time after pipe is installed . . . to prevent sagging pipe and water traps, and to assure positive drainage. This is just *one* of the ways Grinnell Engineered Pipe Hangers save you maintenance expense, give you a better installation.

A good piping job is too important to jeopardize with improvised or inadequate pipe hangers and supports. There's a Grinnell Hanger for every piping requirement. All Grinnell Hangers comply with piping code specifications.

**CB-UNIVERSAL CONCRETE INSERT (Fig. 282)**  
 . . . Used for pipe lines up to 12 inches where sizes of hanger rods cannot be readily determined in advance of ceiling construction. This insert is cast in one body size only. V-type teeth grip a special removable nut which is ordered separately and can be furnished topped for  $\frac{3}{8}$ ",  $\frac{1}{2}$ ",  $\frac{3}{8}$ ",  $\frac{3}{4}$ " or  $\frac{1}{2}$ " hanger rods. Face of insert can be concealed by ceiling finish.

**ADJUSTABLE SWIVEL PIPE RING (Fig. 101)**  
 . . . Solid ring of malleable iron. Twelve sizes provide load range of 80 lbs. for  $\frac{3}{4}$ " size, to 1510 lbs. for 8" size.

**LOCKING SWIVEL SHANK of Fig. 101 Pipe Ring . . .** To obtain proper adjustment, swivel shank can be turned easily by hand when the weight of the pipe is temporarily taken off the ring. When weight is returned, swivel shank locks automatically, preventing change of adjustment due to vibration. Wire retaining ring keeps swivel shank and pipe ring or yoke from separating, makes assembly a single unit.



## GRINNELL


AMERICA'S #1 SUPPLIER OF  
PIPE HANGERS AND SUPPORTS



Grinnell Company, Inc., Providence, Rhode Island

Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports  
 Thermoliner unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems



## MODERN FIRE PROTECTION SYSTEM

*Reduces  
Insurance Costs 80 Per Cent  
for the Crest Company*

It's good business to anticipate emergencies . . . and save money at the same time. The Crest Company, Edgefield, S.C., automobile seat cover manufacturers, did it with an automatic sprinkler system and a 75,000-gal. Horton® elevated water tank. This combination provides fire protection 24 hours a day to the plant's 32,300 sq. ft. of floor area. In addition, it has reduced the cost of fire insurance premium from \$25.50 to \$5.10 per thousand . . . a savings that will repay the entire cost of the sprinkler system and tank in about seven years.

A Horton elevated tank will provide a dependable gravity pressure water supply for your plant too. Horton ellipsoidal-bottom elevated tanks are built in sizes to 500,000 gals. . . radial-cone bottom tanks to 3,000,000 gals. Write our nearest office for complete information.



### Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston  
Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City  
San Francisco • Seattle • Tulsa

Plants in  
BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

*The 75,000-gal. Horton ellipsoidal-bottom elevated water tank shown above provides a primary water supply for the automatic sprinkler system at the Crest Company, Edgefield, S. C.*



## News of electrical progress from I-T-E



**Biggest vs. smallest.** Illustrated above is one of I-T-E's 15 kv power breakers. Man holds tiny BullDog Pushmatic circuit breaker for use in 15 amp domestic lighting circuit—latest addition to I-T-E's family of products.

## I-T-E SHAPES BROADER LINE

**Air circuit breaker pioneer meets rising power trend  
with products reaching from utility to user**

If predictions can be trusted, there's one thing Americans can be certain of during the next 10 years: electric power consumption will increase at least 100%. So again this year, I-T-E has further expanded its already broad line of products for power distribution.

Best-known products of I-T-E are its air circuit breakers—ingenious protective devices that automatically interrupt current flow in case of overloads, short circuits or other faults. Today, I-T-E's line of breakers ranges from the 15,000 volt class down to the tiny household lighting circuit breakers. Other I-T-E products include isolated phase bus, unit substations, switchgear, high voltage switches and insulators—all important elements in distributing and protecting the nation's power.

If you're planning new construction requiring electric power, take advantage of the economy and dependable performance that go with buying your complete power distribution equipment from I-T-E. Simply contact the I-T-E sales office nearest you. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.

**I-T-E CIRCUIT BREAKER COMPANY • Philadelphia, Pa. • Greensburg, Pa. • Victor, N.Y.**

BullDog Electric Products Company, Detroit, Mich. • BullDog Electric Products Company (Canada) Ltd., Toronto • Eastern Power Devices Ltd., Toronto, Canada

SOUTHERN POWER & INDUSTRY for MAY, 1955



**Isolated phase bus.** Carries power directly from the generator to first major primary substation. Rigidly braced heavy conductor is enclosed in a grounded metal housing.

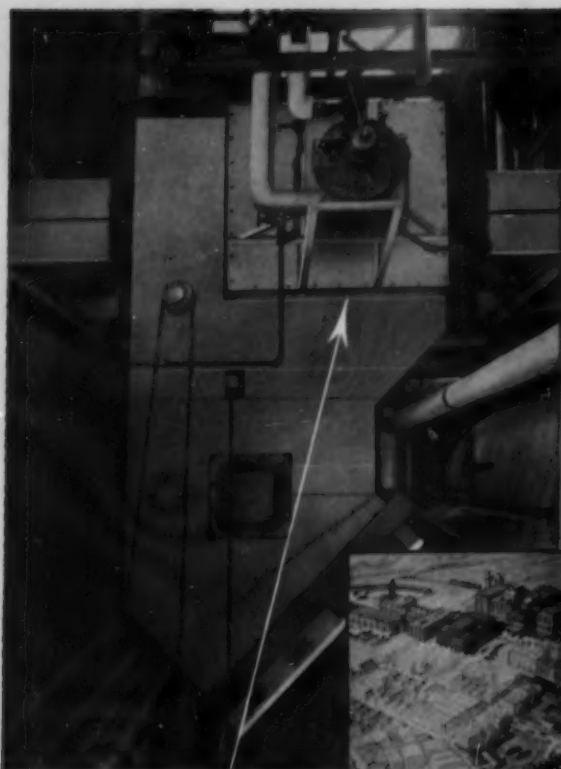


**Unit substation.** A unit for reducing voltages, distributing power, and protecting equipment and personnel.

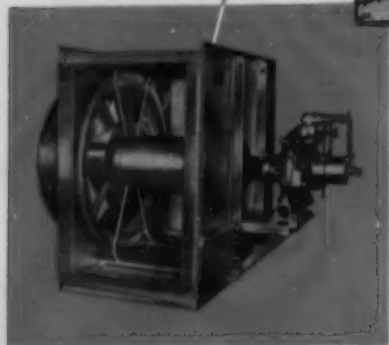


**Molded case circuit breaker.** This unit shown in metal enclosure provides dependable protection against overloads, short circuits, and other faults in individual circuits.





Showing Wing Draft Inducer installed as elbow in breeching.



#### WING POWER PLANT DRAFT INDUCER

May be Turbine or Motor-Driven. Fan and bearing assembly may be withdrawn from housing for inspection and servicing.

### L. J. Wing Mfg. Co.

169 Vreeland Mills Rd., Linden, N.J.  
Factories: Linden, N.J. & Montreal, Can.

# Wing



## SPACE PROBLEM SOLVED BY WING PACKAGED POWER PLANT DRAFT INDUCER



### at BALLANTINE'S one of the country's leading breweries

At P. Ballantine & Sons, Newark, N.J., a 70,000 lb./hr. boiler was installed with forced draft supplied by a Wing Turbine Blower. A 200-foot stack served this and one other boiler. Lightning removed 30 feet of the stack making the chimney draft inadequate. Conventional fans, because of large space requirements, would not do. A Wing Packaged Draft Inducer was installed in the existing breeching with no major changes and within the available space. *More facts about Wing Draft Inducers in Bulletin 1-55. Use the coupon.*

L. J. Wing Mfg. Co., Linden, N. J. SPI-5

Please send me bulletin on WING DRAFT INDUCERS.

Name .....

Firm .....

Address .....

City ..... Zone ..... State .....



\$\$\$

## For Your Ideas

SP&I's "Helping the Man-in-the-Plant" department (see page 92) features, ideas, methods and gadgets — many plant-tested in Southern and Southwestern industrial, power and service plants.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry  
806 Peachtree St., N.E.  
Atlanta 5, Georgia



# Modernize your boiler room with this dual-fuel firing unit

## AUTOMATIC CONTROLS

All combustion controls are completely assembled, wired, and tested at the factory. They're fully enclosed in a single control panel for permanent protection from dust and damage.

## FORCED DRAFT SYSTEM

This forced draft air supply makes possible automatic modulation over a wide range. It is sealed for positive pressure firing and eliminates need for a high stack. Direct-drive construction and low-speed ball-bearing motor assure long trouble-free life.

## GAS OR OIL, OR BOTH

The Iron Fireman combination gas and oil burner allows switch in operation from one fuel to another at a moment's notice. Overcomes fuel shortage problems; gives seasonal price advantages.

## BUILT-IN REFRACTORY

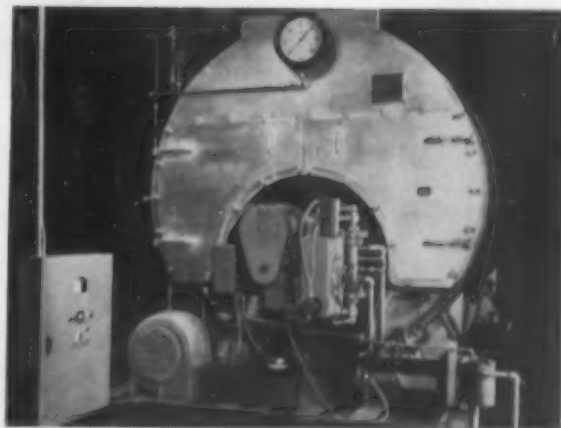
The combustion throat, with built-in refractory, is an integral part of burner assembly. Eliminates on-the-job brickwork.

## More than a burner— a complete **PACKAGE** firing system . . .

Iron Fireman package units are much more than conversion burners. They are *complete combustion systems*—with integrated burner (for gas or oil, or both), fuel control system, forced draft air supply, automatic controls, and pre-formed refractory combustion throat.

These firing units are adaptable to practically every type of boiler. Installation consists of little more than attachment to the boiler front, and making electrical and fuel connections. Consequently, installation time costs are sharply reduced from those of any comparable system, assembled in the field.

The Iron Fireman package plan factory-assembles all component parts. It eliminates the divided responsibility of assorted local contracts. And it brings long-range fuel and operating savings, which explain why more and more plants—like that of the Menasha Woodenware Corp.



Menasha Woodenware Corp., Rockford, Ill., reports their Iron Fireman package unit has lowered fuel costs 6.6% during its first year, with steadier firing and greater cleanliness. Package units are available in a complete range of sizes, as well as the boiler-burner combination shown here. Installation by Allied Heating Engineers, Rockford, Illinois.

shown here—are switching to Iron Fireman package units.

It will pay you to get full information on Iron Fireman package burners and boiler-burner units. Just mail the coupon or write.

Send for full information . . .

# Iron Fireman®

AUTOMATIC FIRING EQUIPMENT FOR OIL, GAS, COAL  
HEATING, PROCESSING, POWER



IRON FIREMAN MANUFACTURING CO.  
3950 W. 136th Street, Cleveland 11, Ohio.

In Canada, 30 Ward Street, Toronto, Ontario.

Send information on Iron Fireman package burners.

Name

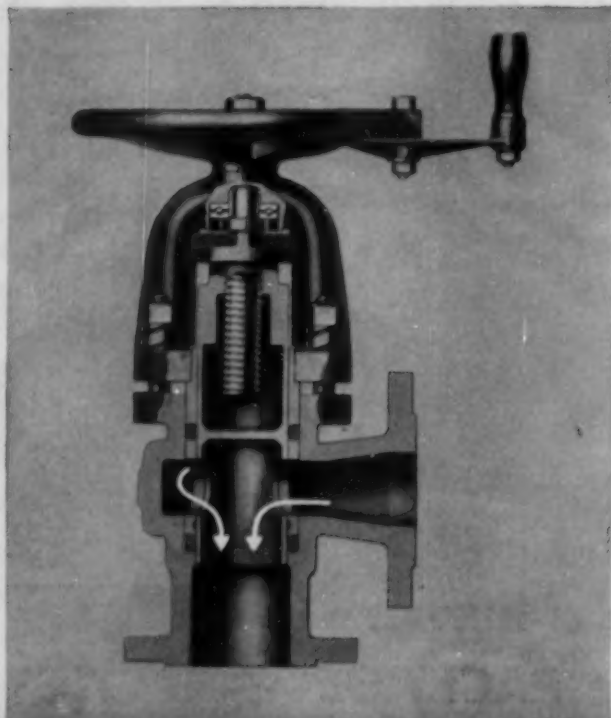
Address

City  State

# These YARWAY VALVE DESIGNS

## YARWAY SEATLESS

Features balanced nitralloy hollow plunger that seals line drop-tight, yet permits free, unobstructed flow in blow-down. Other features — laminated packing, alemite lubrication, ball thrust bearings. USED SUCCESSFULLY IN OVER 15,000 BOILER PLANTS.



FOR  
LOW and  
MEDIUM  
PRESSURES

## YARWAY HARD-SEAT

Features tough, stellite-faced and ground disc and seat ring, mated to provide smooth long-wearing surfaces. Stream-line flow. Alemite lubrication. MORE THAN 4 OUT OF 5 HIGH PRESSURE BOILER PLANTS USE YARWAY BLOW-OFF VALVES.



FOR  
HIGHER  
PRESSURES

**USED IN OVER 15,000 BOILER PLANTS**



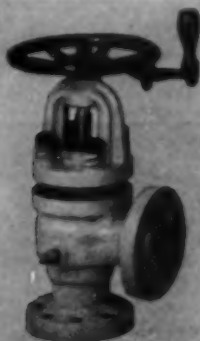
# serve every boiler blow-down need

■ Whatever your pressure requirement, whatever your piping requirement—there's a Yarway Blow-Off Valve to exactly meet your needs.

Popular Yarway *seatless* design keeps blow-down lines drop-tight in low and medium pressure ranges. Sturdy Yarway *stellite seat and disc* design protects higher pressures.

All Yarway Blow-Off Valves are strong, rugged valves, built to withstand the punishment of regular or emergency blowing-down under full boiler pressure, and are available in metals that stand up under acid washing of boilers.

Write for new Yarway Blow-Off Valve Bulletins—B-426 (pressures to 400 psi) or B-434 (pressures to 2500 psi).



• Yarway Type B Seatless Blow-Off Valve, iron body for boiler pressures to 200 psi, steel bodies for pressures to 400 psi. Angle valve shown, straightway available. Flanged connections. See Bulletin B-426.



• Yarway Type B Seatless Tandem Blow-Off Valve combining two angle valves. Other combinations available. Iron bodies for boiler pressures to 200 psi, steel bodies for pressures to 400 psi. See Bulletin B-426.



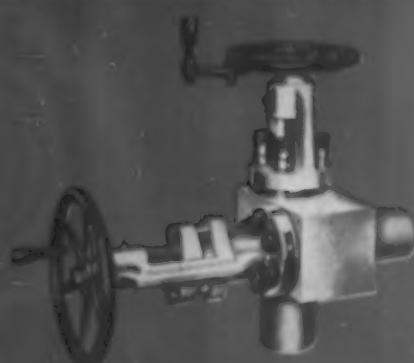
• Yarway Type C Seatless Tandem Blow-Off Valve combining angle and straightway valves. Other combinations available. Flanged or welding connections available. For boiler pressures to 400 psi. NOTE: When used in tandem with a Yarway Hard-Seat Valve, Type C Seatless may be used to 1500 psi. See Bulletin B-426.



• Yarway Hard-Seat Blow-Off Valve for pressures to 2500 psi. Straightway valves shown. Angle available. Welded (shown) or flanged connections. See Bulletin B-434.



• Yarway Hard-Seat—Seatless Exhaust Tandem Blow-Off Valve. Hard-Seat is the blowing valve, seatless is the sealing valve. Available in any combination of connections. For pressures to 1500 psi. Hard seat-hard seat tandems for pressures to 2500 psi. See Bulletin B-434.



• Yarway Unit Tandem Blow-Off Valve. Combines a hard seat blowing valve and a seatless sealing valve in one-piece forged steel body for boiler pressures to 1500 psi. For pressures to 2500 psi, two hard-seat valves are recommended. See Bulletin B-434.

LET YARWAY HELP SOLVE YOUR  
BOILER BLOW-DOWN PROBLEMS!

**YARNALL-WARING COMPANY**

Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.

Southern Representative:

ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

# YARWAY

## blow-off valves



## NEW YORK STOCK EXCHANGE

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**BULLS and BEARS**  
all agree on the  
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Pioneer in Comfort Cooling — First Installation in 1903

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### AIR CONDITIONING CONTROL Used in this World Famous Securities Market

Also in the MIDWEST and TORONTO Stock Exchanges

Efficient execution of your orders in these markets is aided by the ideal air conditions automatically controlled by Powers. No matter how the market fluctuates, air conditions always remain stable on the trading floor and in other spaces.

For more than 60 years Powers has supplied systems of automatic temperature and humidity control for all types of prominent buildings and thousands of industrial processes. Here are some important users:

Ford Motor Co. • General Motors Corp. • Douglas Aircraft Co.  
Rockefeller Center • Radio City Music Hall • Madison Square Garden  
Many buildings at Harvard University, M.I.T., Illinois Tech  
Abbott Laboratories • Armour Pharmaceutical Center  
Aluminum Co. of America • Standard Oil Co. of New Jersey  
Argonne National Laboratory and other A.E.C. Buildings  
Radio Corp. of America • Sunbeam Corp. • Zenith Radio Corp.

**Your Problems of Temperature and Humidity Control** may be similar to many Powers has helped solve for the users listed above. For further information phone your nearest Powers office or write us direct.

Factory and General Offices: Skokie, Illinois



Mr. D. A. Kepler, Chief Engineer of the N.Y. Stock Exchange, in the photograph above, reports temperature is held within limits of approximately 1°F. plus or minus.

(a94)

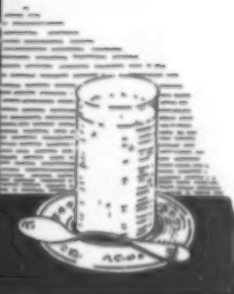


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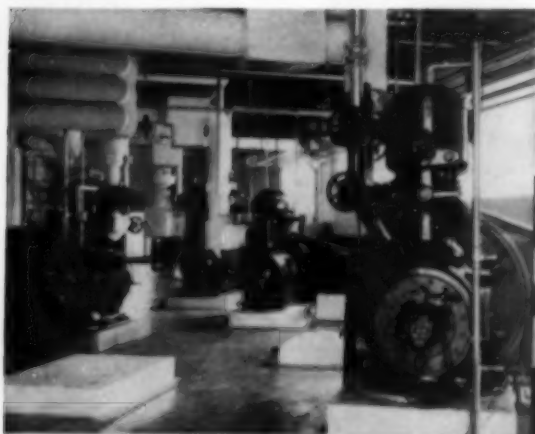
## ORLANDO PLANT PACKS 24 MILLION CANS OF FROZEN FRUIT JUICES WITH



## Refrigeration

The Southern Fruit Distributors use five large Frick ammonia compressors in their new Florida processing plant. These machines give a four-fold service: evaporating citrus juices in a heat-pump cycle, chilling juices and pulp later added to the concentrate, quick-freezing the final product, and storing the frozen cans at zero.

When you need dependable refrigeration or air conditioning, look to Frick engineers for complete service. We design, manufacture, install and maintain systems, either with the cooperation of your contractors, or on a direct basis. Let us quote on your requirements now.



Above: Booster and Second-stage Compressors Handle Low Temperatures Most Economically at Orlando Plant.

Right: Four-cylinder Compressor with 700-hp. Motor, on Heat-pump Service.



# Depend on **LADISH**

Carbon Steels

Carbon-Molybdenum Steels

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½ inch through 42 inches . . .



**FORGED CORROSION RESISTANT—LIGHT WEIGHT and A.S.A. FLANGES**

½ inch through 24 inches . . .



**FORGED SCREWED OR SOCKET WELDING FITTINGS and UNIONS**

⅜ inch through 4 inches . . .



**LARGE DIAMETER AND T.E.M.A.\*  
STANDARD FLANGES up to 20 feet O.D.**

**LONG WELDING NECKS  
up to 24 inches, 150 lb. through 2500 lb.**

\*Tubular Exchanger Manufacturers Association

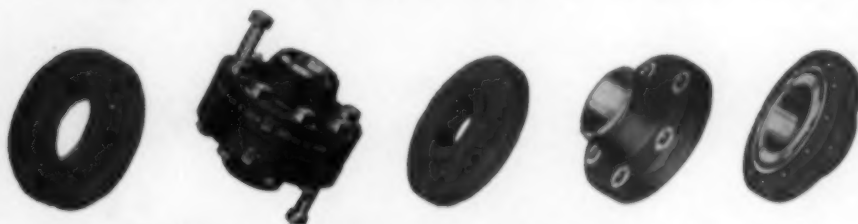


# Complete Service ...



**BUTT WELDING FITTINGS**

Schedules 5S, 10S, 40S, 80S, and other Schedules and wall thickness.



**FORGED CORROSION RESISTANT—LIGHT WEIGHT and A.S.A. FLANGES**

150 lb. through 2500 lb. pressure ratings.



**FORGED SCREWED OR SOCKET WELDING FITTINGS and UNIONS**

150 lb. Corrosion Resistant and 2000 lb. through 6000 lb. ratings.

## FOR FITTINGS FROM ANY FORGEABLE MATERIAL TO MEET YOUR SERVICE REQUIREMENTS

You get prompt, efficient service when you specify and order from the complete Ladish Controlled Quality line. Fittings in any forgeable material in virtually every type, size, wall thickness or pressure rating ... are produced to one uncompromising Controlled Quality standard ... and identified with heat code symbols pioneered by Ladish as verification of metallurgical integrity resulting from exhaustive tests made in the Ladish metallurgical laboratories.

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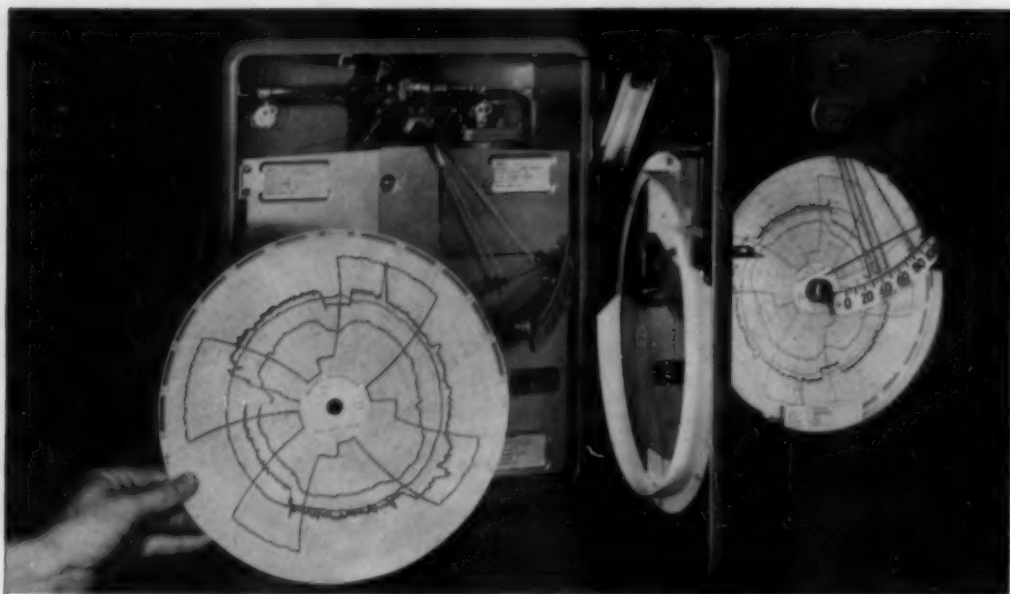
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★ Faithful chart records of measured variables are the key to a meaningful, dependable analysis of operating trends and conditions. Money spent for more accurate metering, for faster response, is money down the drain—unless it's matched with chart records that are equally accurate.

That's why these features of the new Bailey Recorder are important to you:

1. Bailey's exclusive sealed capillary-action inking system maintains continuous flow to the pen tip, and traces sharp, opaque, quick-drying records. "Poisoning" of intersecting records is practically eliminated; no blots or smears during operation or chart changing.
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3. Interchangeable plug-in receiver units permit practically limitless record-grouping combinations.

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1782-1



### **ONLY BAILEY OFFERS ALL THESE ADVANTAGES IN A SINGLE RECORDER**

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**BAILEY**  
METER COMPANY

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*Controls for Power and Process*



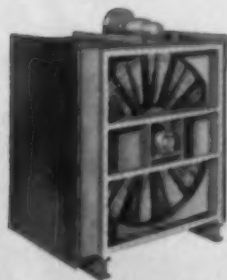
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*big-unit fuel economy for small boilers!*



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Find out how the efficient, low-cost Package Ljungstrom Air Preheater can be applied to your steam-generating units. Write, today, to The Air Preheater Corporation.

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SOUTHERN POWER & INDUSTRY for MAY, 1955

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**WITHOUT OBLIGATION...** Buell Engineers submit samples of your valuable dust to their laboratory for analysis...make a thorough, on-the-spot study of your operations!

**THEY RECOMMEND** from the complete line of Buell Dust Recovery Equipment the unit, or combination of units... that is most suitable for your operating conditions.

**BUELL "SF" ELECTRIC PRECIPITATOR** with its exclusive "Spiralelectrodes" and continuous cycle rapping! Buell Cyclone Collector with its exclusive "shave-off" design! Buell PMV Non-Returning Hopper Valves with their positive sealing and self-cleaning features! These are just some of the reasons why Buell Engineers can offer you the ultimate in valuable dust recovery.

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**WRITE TODAY** for free booklet: The Collection and Recovery of Industrial Dusts—which clearly explains *all three* Buell Systems. Dept. 80-B, Buell Engineering Company, 70 Pine Street, New York 5, N. Y.



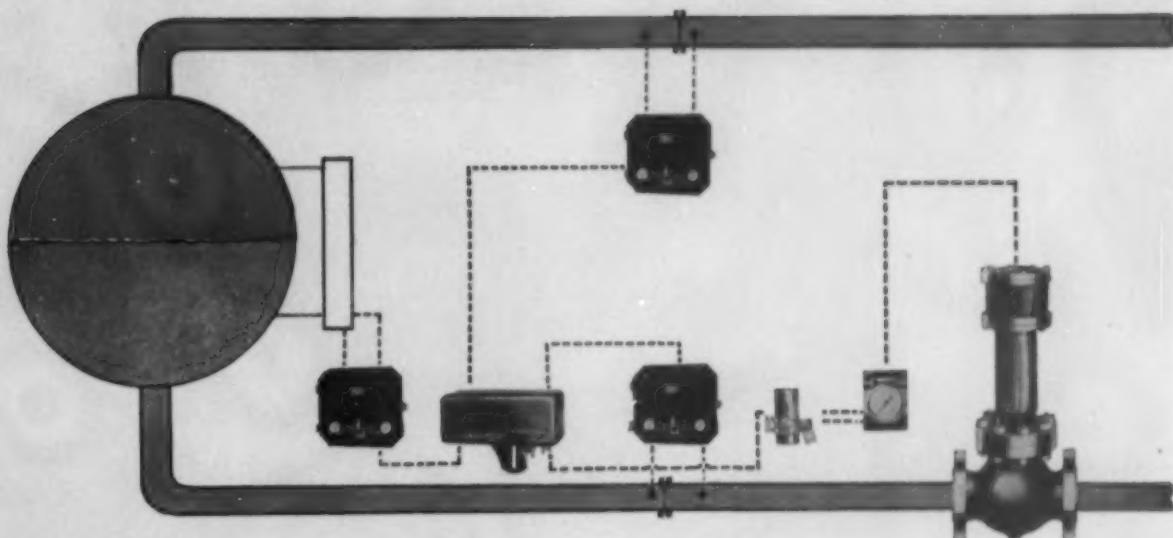
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*20 Years of Engineered Efficiency in*  
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# This *NEW* COPEs Type 3-L System offers you a three-influence feed water control that is fast, accurate and simple



Now, from the oldest comes the newest—the COPEs Type 3-L Control System by which feed to the boiler is modulated by three influences; steam flow, feed water flow and drum water level.

With it, feed-water input closely matches steam output not only on constant loads but during periods of rapid, wide load changes. Water level is maintained within close limits at all times, regardless of changes in load or feed pressure, and while blowing down or blowing soot.

Due to its simplicity a minimum of instruments is required. Recorders may be omitted.\*

Each component of the COPEs Type 3-L System is selected for its accuracy and high quality. Every Copes installation is backed by nationwide service, whenever or wherever required, for its entire life.

\* Miniature recorders or standard size recorders (by Taylor) can be supplied. COPEs Three-Influence Control may also be actuated mechanically or electronically.

## COPEs-VULCAN DIVISION

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*First to develop continuous boiler feeding under automatic control*

# BOILER FEED WATER REGULATION

# In doubt about high temperatures and pressures?



## Put your confidence in NATIONAL Seamless

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You just can't beat USS NATIONAL Seamless Pipe and Tubes for power plant service—even under the most grueling service conditions. Pierced from solid billets of steel, NATIONAL Seamless Pipe and Tubes have the strength, uniformity, and dependability of solid forgings—properties that keep them structurally sound under intense pressures and ever-rising temperatures.

Write for further information on the use of NATIONAL Seamless Pipe and Tubes in safer, more dependable, more economical power installations. And for peace of mind when purchasing, always say "NATIONAL Seamless."



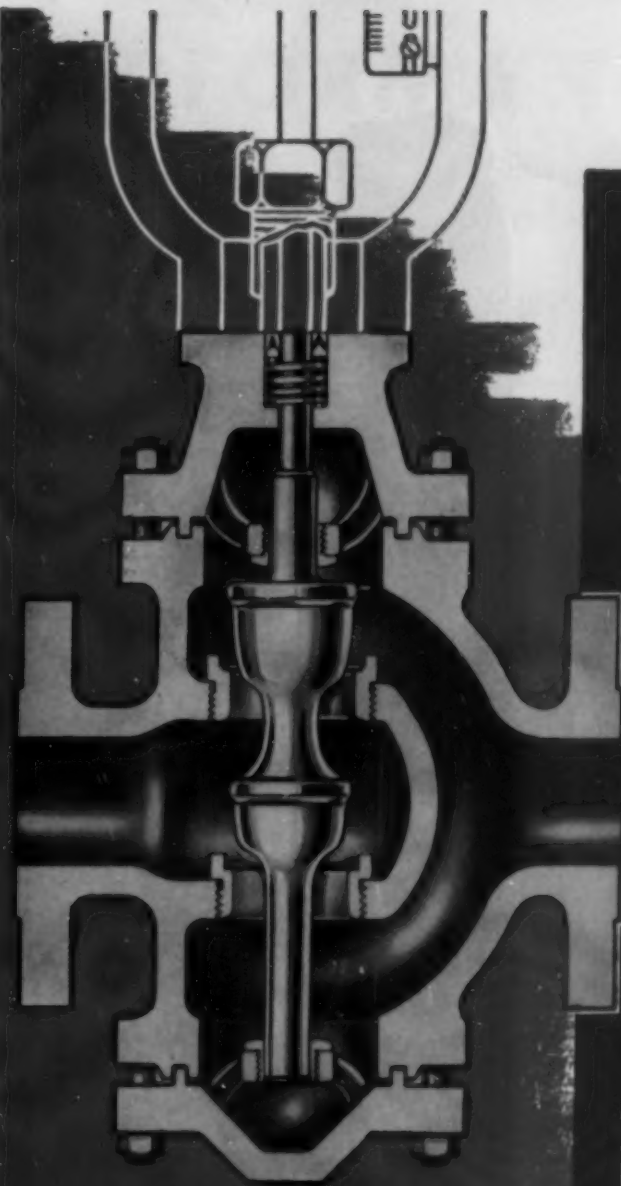
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UNITED STATES STEEL



Insures superior control with tighter shut-off on high temperature service.

Both upper and lower seating surfaces contact simultaneously at specified operating temperatures.

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**IS THE VALVE  
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THAT LAPS THE  
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DOUBLE PORTED  
VALVE BODIES  
AT OPERATING  
TEMPERATURES**



Fisher valve being steam heated to specified operating temperature.



Inner valve being "ground in" while assembly is hot.

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*Our 75<sup>th</sup>*  
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**we've got it!**

*from America's finest coal fields!*



**The "BIG 3" reasons why  
you should order B & Z coals!**

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- 2.** Correct coal for your burning equipment!
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Mount Hope Coal Company  
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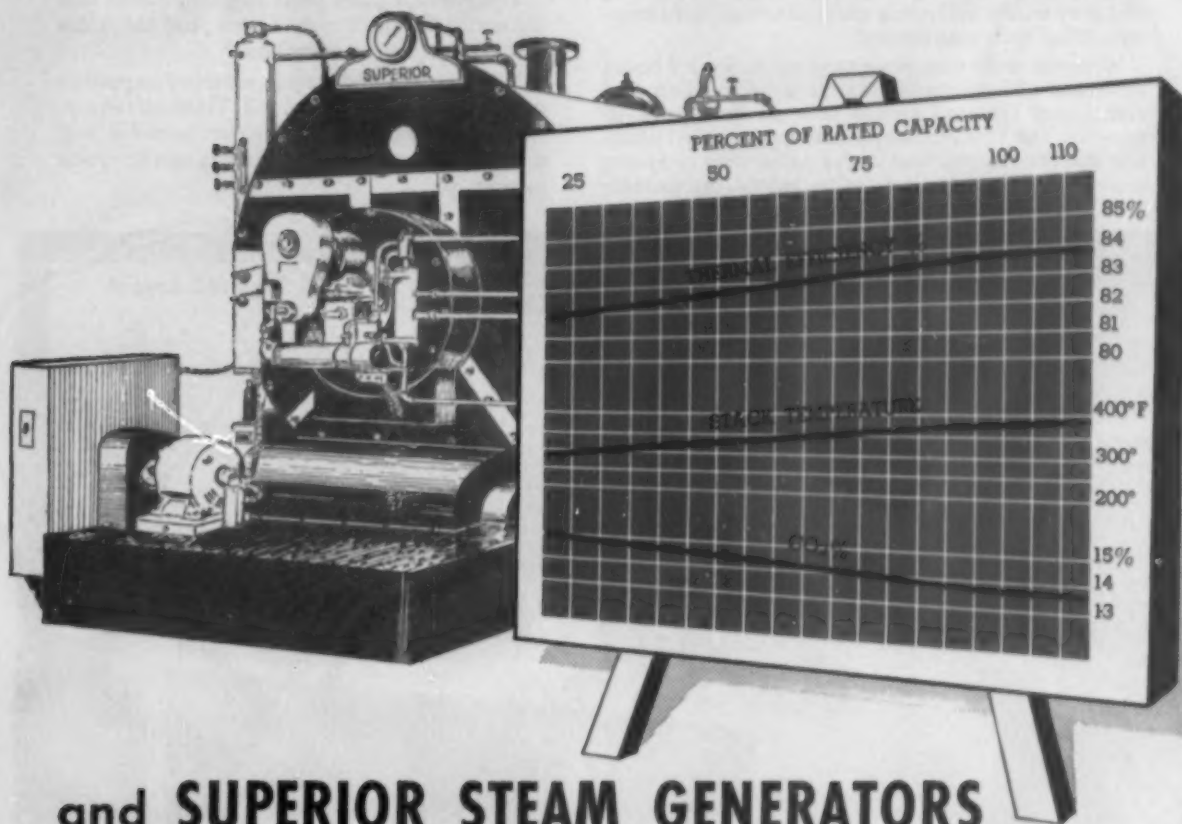
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are rated for actual operating conditions

Superior Steam Generators are fully automatic, burning oil or gas or both. 18 sizes from 20 to 600 b.h.p. for pressures to 250 p.s.i. or for hot water. Write for catalog 711.

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for performance you can **BANK** on

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**SUPERIOR**  
STEAM GENERATORS

# Reinforcing Rod Plant UPS PRODUCTION 300%

## Cleveland Tramrail System Pays For Itself In 6 Months

**A**FTER a reinforcing rod plant built a new building and equipped it with Cleveland Tramrail cranes, manufacturing costs took such a nose dive that they would make any cost-conscious plant manager blink with amazement.

Whereas eight men were required to work 8 hours to unload a 50-ton car of rods in the old building, two men using Tramrail cranes now do the job in 30 minutes. The Tramrail equipment has enabled doubling the production, and at the same time reducing man-hours by one-half. In other words, the produc-

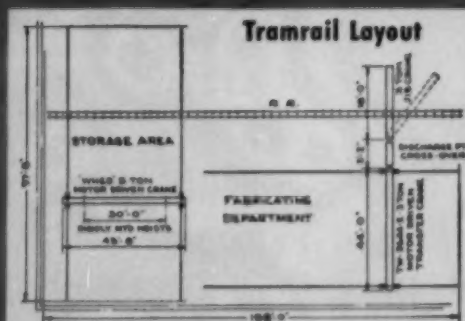
tion per man-hour is four times what it formerly was.

The savings have been so phenomenal that the entire Tramrail system was paid for in the first six months of operation.

Nearly every industry is securing important advantages with Cleveland Tramrail equipment. A nearby Tramrail sales engineer will gladly suggest ways that savings can be made in your plant.



3-ton crane handles 60'-0" long bundles of rod from railroad car to storage and to shear.  
Outgoing truck is quickly loaded with 3-ton crane.



Note that 3-ton loads can be handled directly between job crane and 3-ton transfer crane.



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THE CLEVELAND CRANE & ENGINEERING CO.  
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**CLEVELAND TRAMRAIL**  
OVERHEAD MATERIALS HANDLING EQUIPMENT

... One leading public utility has a 4,500 psi, 1,150F double reheat cycle unit under construction. Another announced plans for a new supercritical pressure, steam electric station. The single-boiler-turbine-generator unit for this new station will operate at a higher steam temperature and pressure, and will have a capacity greater than any installation thus far announced. Using supercritical pressure, and employing two stages of reheat, the new unit should be the most efficient plant thus far projected by the central station industry. The 6,000 psi steam generator will supply steam to the turbine at 5,000 psi, 1,100F....

**AS POWER PIPING BECOMES MORE CRITICAL**

**M. W. KELLOGG**

**TESTING**

**TECHNIQUES**

**KEEP PACE**

To meet the demand for more electric power, and to increase output with the least possible increase in fuel, the trend in utility steam power plants, as reported everywhere, is to higher temperatures and pressures. Thus steam piping—main and reheat—becomes even more critical than before.

One way in which The M. W. Kellogg Company, leading fabricator of power piping, keeps pace with increases in temperature, pressure, and capacity demands is in its testing techniques. Most recent Kellogg development is the company's "atomic camera". Activated by isotopes such as cobalt, iridium, and cesium, this powerful and portable device can photograph welded seams up to six inches thick in a single, short exposure. The same test by traditional X-ray equipment would take considerably longer.

The M. W. Kellogg Company was among the first to be permitted by the AEC to use isotopes of this magnitude. The atomic camera has already proved its value in the construction of many important public utility jobs. It is indicative of the Kellogg research and engineering which guard the vital link between steam power plant boilers and turbines.



M. W. KELLOGG'S  
"ATOMIC CAMERA"

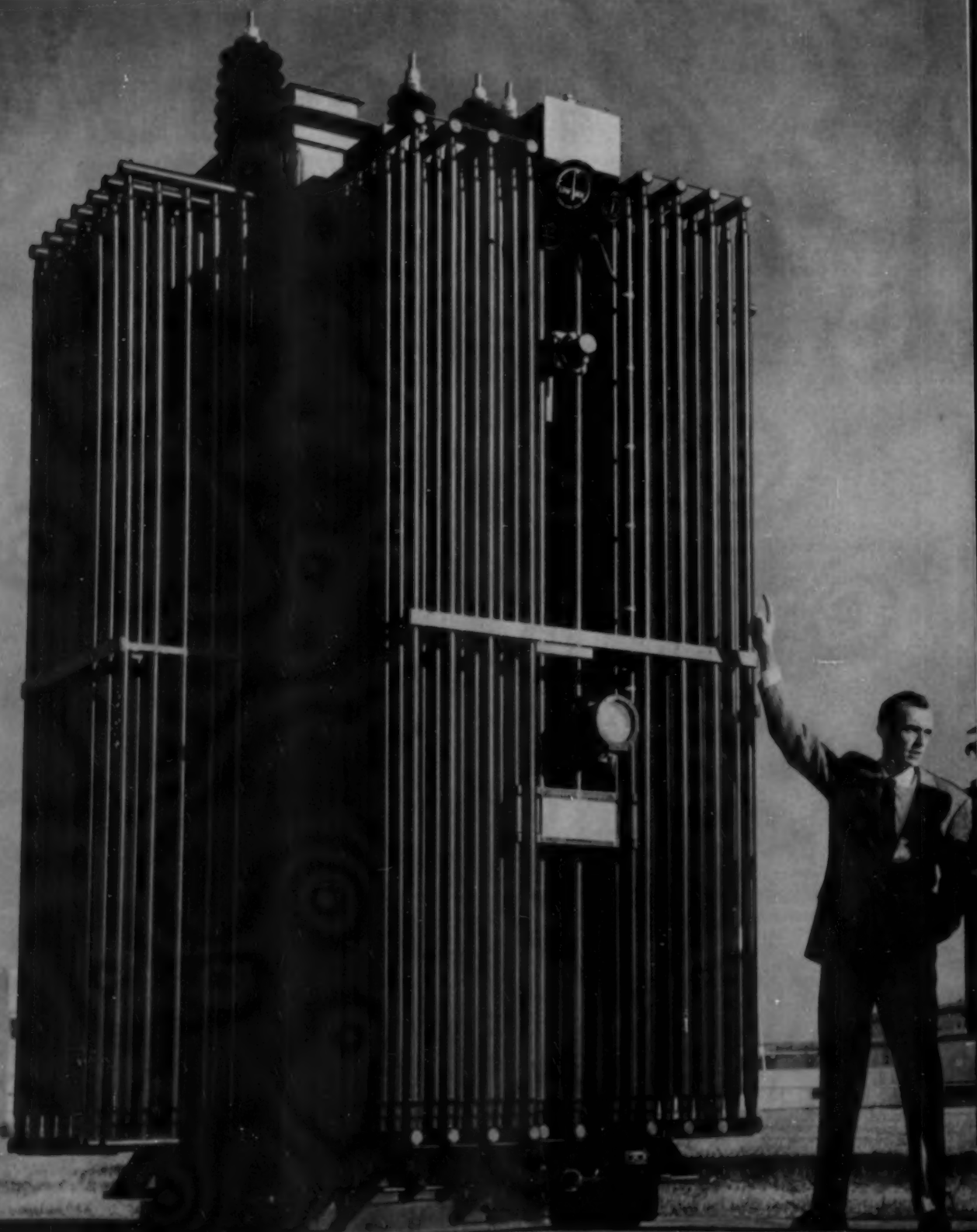
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THE M. W. KELLOGG COMPANY, 225 BROADWAY, NEW YORK 7, N. Y.  
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**POWER PIPING—THE VITAL LINK**

ANNOUNCING

**the new 1955 G-E**





# RM power transformer

**A COMPLETELY RE-DESIGNED TRANSFORMER...  
WITH INSTRUMENTS GROUPED IN ONE EASY-  
TO-READ CONTROL CENTER... PLUS MANY  
OTHER NEW FEATURES YOU'VE ASKED FOR**

Now a complete re-design of General Electric's entire RM (Repetitive Manufacture) line of power transformers brings you many new features that mean easier installation, less maintenance and longer life.

In the new 1955 line of RM transformers, for example, all instruments are grouped in one convenient location. Called the "control center," this unique arrangement improves visibility and simplifies maintenance. Recessed behind the cooling tubes, all accessories including the tap changer operating handle are protected against accidental damage. All are safely accessible even with the transformer energized.

Many new money-saving features of G.E.'s 1955 RM transformer line resulted from product planning meetings with more than 75 electric utilities. Such things as American Standard bushings, weather-tight conduit, extra jacking space, and pre-fitted arrester-to-bushing connectors were first suggested by the men who actually use and install transformers.

The 1955 line has also been re-designed to give you a transformer of even greater reliability. Use of Formex\* wire, for example, results in a smaller, lighter, yet more dependable unit. All single-phase transformers feature improved performance because of Spirakore\* construction which gives you the full benefit of the directional properties of grain-oriented steel.

Your acceptance of power transformer standardization has made this new transformer possible. Available in ratings 501 to 5000 kva single phase and 501 to 10,000 kva three phase, 69 kv and below, 1955 RM transformers are being built at Rome, Georgia, on the nation's only real "mass production" line for power transformers. To see how these new transformers can benefit you, just get in touch with your nearest G-E Apparatus Sales Office or write for Bulletin GED-2505. Address your request to Section 416-1, General Electric Company, Schenectady 5, New York.

\*Reg. trademark of General Electric Company



*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

**Fewer Parts  
Mean  
Greater  
Dependability**



Floorstand Motor Unit . . . control panel, motor, limit switch and push button station.



Simple, durable mechanism of Chapman's Motor Unit. Handwheel remains stationary during motor operation.

## IN CHAPMAN MOTOR UNITS

Chapman's simple and rugged Motor Unit gives accurate, trouble-free control of large valves and sluice gates. It has approximately *half as many parts* as any other unit. Its simplified design, low speed motors and low-ratio, stubtooth gears combine to give positive operation without drift, in *any* position and under all conditions.

Installation is fast and simple. The floorstand unit comes completely wired, ready to connect to leads. Limit switch has micrometer adjustment for exact pre-setting for seating tightness. Motor Units operate smoothly under the most adverse conditions. All units are weather-proof and steam-tight. Write today for *new* Catalog 51.

**The Chapman Valve Manufacturing Co.**

INDIAN ORCHARD, MASSACHUSETTS

# TIMELY COMMENTS



## "No Work on Weekends and Holidays"

ONE of the articles submitted for this MAINTENANCE issue by the head of Maintenance for a large industrial plant, comments casually in one paragraph: "We (maintenance men) do not normally work on weekends and holidays."

That will sound like an odd statement to many old timers that remember "round the clock work" during such periods.

Some older workers may say "the gang is getting soft—they can't take it any more." But maintenance procedures have undergone many changes in recent years. The trend toward less "over-time" work is strong.

Better planning (long range and short range) with emphasis on PREVENTIVE maintenance is the key to many improvements in modern maintenance.

Another procedure employed in many heavy process industries is the annual "plant shut-down." During these annual periods, operators take vacations, and most of the maintenance men work on planned repairs that cannot conveniently be handled with machines in production.

Lower maintenance costs are also promoted by giving more thorough consideration to maintenance while designing plants and machines. Easily accessible piping and wiring, dryer floors, vacuum cleaning, and better protection of moving parts are all making contributions.

Then also we have special metals and better coatings to resist corrosion; better general purpose lubricants, and special oils and greases for high pressure or high temperature service. The discovery of silicones alone has done much to ease the maintenance man's pain and reduce cost.

New adhesives, new "solders," and new welding techniques make it possible to bond almost any two materials right-on-the-spot. New tools (notably the cemented carbide group) make it possible to repair many things in the plant that

formerly had to be "shipped back to the factory."

While air conditioning is most frequently thought of as a comfort and production aid—it too is sometimes employed solely to combat maintenance on delicate parts such as those in intricate control rooms. Also it permits more accurate fitting of working parts in the manufacturers' shops.

Safety garments and protectors that allow working under conditions that were formerly dangerous or impossible have been developed. Now these protectors allow quick repairs on parts that formerly required extensive shut-downs because of temperature, or chemicals or electricity.

These and many other advances have contributed to better maintenance at lower cost.

So then, many plants can now with complete truth say: "We do not normally work on weekends and holidays."

Many of the "NEW" maintenance aids hinted at above have now become standard practice in certain plants. But few plants indeed are doing all they can to perfect their maintenance programs. And fewer still are taking full advantage of new tools, new materials and new procedures.

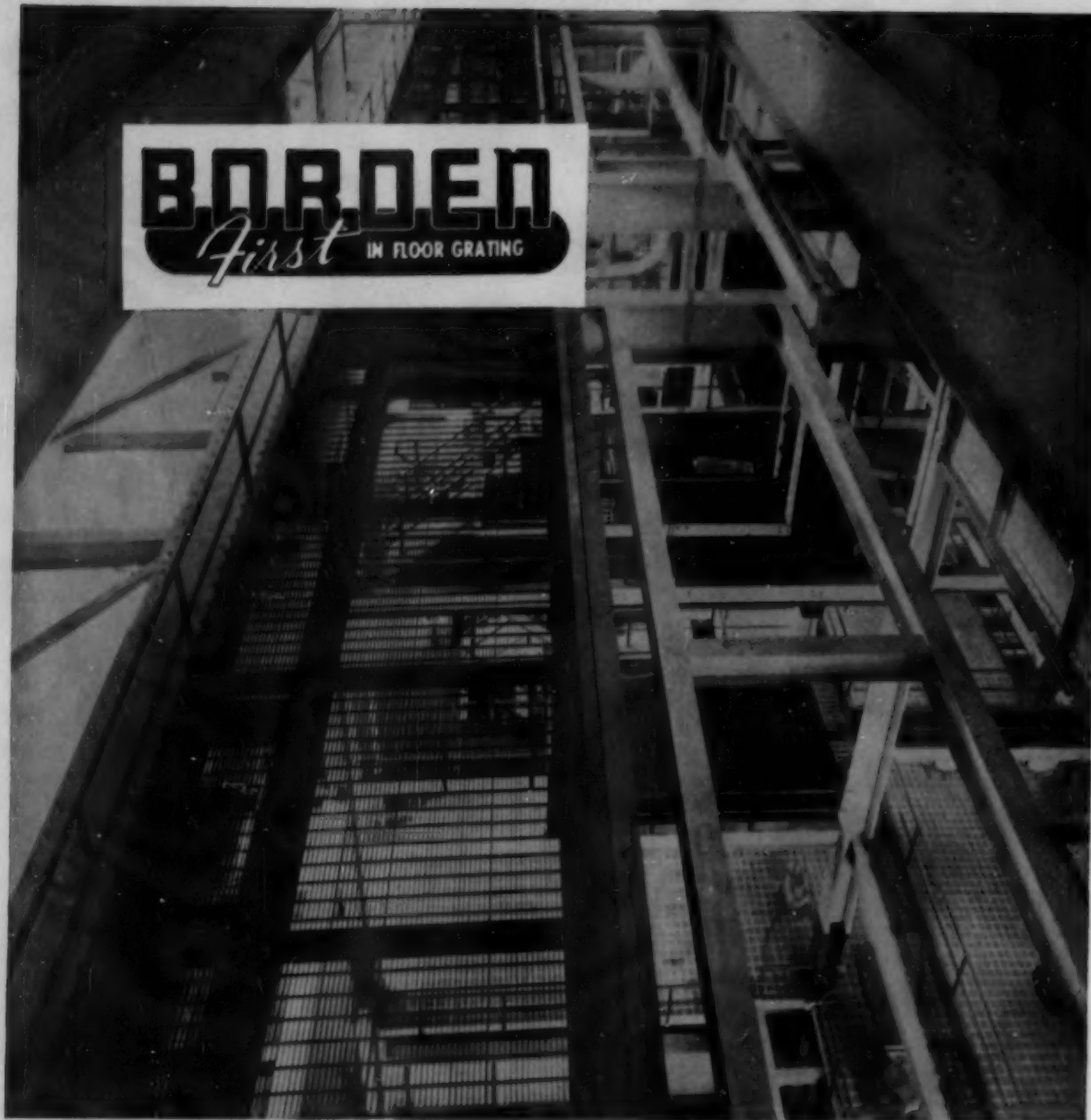
The articles presented in this MAINTENANCE issue do not deal with the SPECTACULAR. All developments discussed are actual, proven procedures in the plants where they are employed—but in other plants they will be NEW.

That is the object of your editors—to take proven results of some plants and offer them as CASE STUDIES to other plants that may need the information.

Few of our subscribers will find it profitable to read every article—but if they will spin the pages of this issue, and read the titles and subtitles, they are sure to find one, two—or a dozen ideas that will help them improve maintenance in their own plants.

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*First* IN FLOOR GRATING



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**A.** SPECIFY BORDEN and receive a completely custom fabricated floor grating including cut-outs, toe plates, fasteners and stair nosings. Be sure with BORDEN's FREE PLANNING AND CHECKING SERVICE.

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# INDUSTRY SPEAKS

SOUTHERN POWER  
AND INDUSTRY

## AUTOMATION and MAINTENANCE

Adapted from comments by R. H. SULLIVAN at a recent Southern Hardwood Producers' meeting in New Orleans, Louisiana. Mr. Sullivan is vice president and group executive of the Ford Motor Company.

**A**UTOMATION has enabled us to provide **safer and healthier working conditions**. We're getting **better quality**. It has resulted in **lower production costs**. And we have been able to **utilize our machines more fully and effectively**.

Along with the advantages, we've run into a number of headaches and problems. On the technical side, we've had to develop **better control systems**, in order to keep the entire operation going at once, with each part in harmony with every other part. **Tool control** is another must. **Preventive maintenance** is considerably more important than in less integrated manufacturing operations.

Frankly, we've run into some **human problems**, too. The replacement of manpower by machines obviously reduces the need for unskilled labor, and that has meant we have either had to train these workers or transfer them to other unskilled jobs. However, the net effect has been to create more and not fewer jobs.

Since the machines require less direct labor for loading and unloading, some people have been raising the old bogey of technological unemployment. You'd think that after a century and a half that scarecrow would have been laid to rest once and for all.

We don't claim to know what the more profound effects of automation will be. And we doubt that anybody does know for certain. We do know what happened when Henry Ford the elder introduced the assembly line and mass production—higher productivity, more jobs, higher wages.

Our engine plants actually are a far cry from being fully automatic. In a completely automatic plant, giant electronic computers would carry the job through from start to finish. What we do have is a substantial improvement over past methods. Where once we had two, three or eight separate man-operated machine tools, we now have a single multi-purpose tool. Where once we had chain hoists and conveyor belts, requiring considerable manual handling of heavy rough pieces, such pieces are now moved automatically from tool to tool, mechanically turned, mechanically removed, and so on. In the process, a considerable amount of direct labor, often of a heavy and laborious nature, has been eliminated.

That's all very well, you might say, but where does that leave the fellows who used to be out there on the line?

I could answer that by asking: If we and other industries did continue to build the older, less efficient facilities, could we be sure of finding the people to work in them next year, five years from now, twenty years from now? In spite of all the automation equipment we have installed since World War II, Ford Motor Company's work force has grown by more than 50-thousand employees.

A high level of employment is necessary, of course, for a high standard of living, because mass consumption is the prerequisite of mass production. But the real secret of a higher standard of living is increased productivity, which in turn generates more purchasing power and more jobs.

In fact, our problem over the next 20 years may well turn out to be finding **enough** workers to satisfy the needs of an expanding economy. The low birth rate of the Nineteen-Thirties means that the actual work force will not be much larger. The high birth rate which began after World War II and has continued down to the present day, however, means a sharply increased **demand** for goods—in other words more output from less labor.

We believe, furthermore, that automation will create more, not less, jobs in industry, service and distribution. For example, the growth of automation is creating many new jobs in the electronic, machine-tool and other industries engaged in building new automated factories. Those industries, in turn, are expanding their own facilities in order to meet the growing demand, and that in turn provides jobs in the industries which provide the tools and plants for the electronics and machine tool industries.

### **Skilled Maintenance Men Needed**

While automation may reduce the direct labor factor in a given plant, it increases greatly the demand for skilled maintenance and repair technicians. Automation will not eliminate jobs; it will supplant heavy, dangerous and unpleasant jobs with easier, more skilled, more pleasant and more interesting jobs.

Automation will bring vast new opportunities to many workers who are willing to work and learn. We are faced with the task of finding the best and brightest people in the work force and training them to the more skilled requirements of these new jobs, and anyone who receives such training is in a very fortunate position. He is in on the ground floor of what promises to be a tremendous factor in our industrial future.

# Specify **CONTINENTAL**

## CONVEYORS AND ELEVATORS

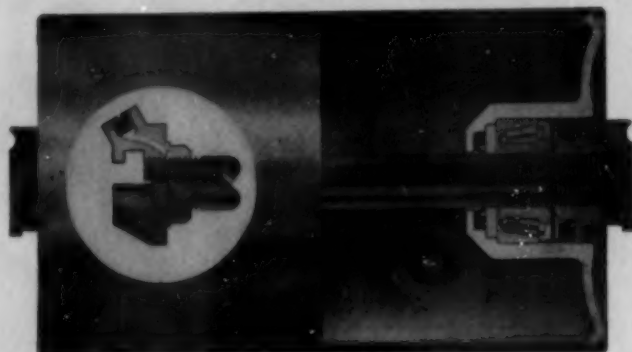
For Minimum Maintenance—Lower Cost

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TYPE "UST" STANDARD IDLERS

Continental's Unit-Sealed "UST" Conveyor Idlers are pre-lubricated for longer life and minimum maintenance. Incorporating Timken Bearings and Garlock Klosures this construction permits operating the Continental "UST" Idler without lubrication for 1-2-3 years or more depending on the severity or character of conditions. Write for bulletin SI-116.

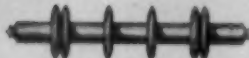
### STANDARD AND HEAVY DUTY



Standard Troughing Idlers



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Space Disc Idlers



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**INDUSTRIAL DIVISION**  
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ENGINEERS



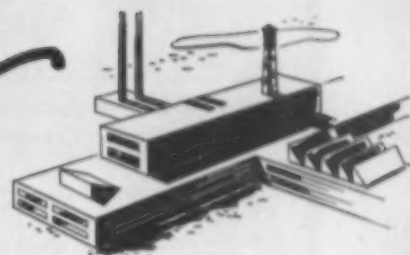
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MANUFACTURERS

NEW YORK CITY

# Maintenance



**MATERIALS • METHODS • SUPPLIES  
PLANS • RECORDS • SCHEDULES • TESTS**

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Complete Table of Contents

## Planning Work on Turbines and Boilers

# Yearly Inspections and Repairs

**By R. B. LEE**

Asst. Superintendent of Production  
Florida Power Corporation  
St. Petersburg, Florida

**T**HERE are numerous instances where high pressure boilers have been operated for two years or more without a long outage. But we have not been fortunate enough to obtain more than 17 months on a boiler, and generally conditions warrant an outage in 12 to 14 months. This is due mostly to using residual fuel oil as a fuel in all of our boilers.

Our insurance carriers limit the periods between internal inspections on our steam turbines and generators. And naturally we also want to keep this equipment in good operating condition and correct damage or wear before it can cause a costly failure. Of course some chance must be taken, but internal inspection periods on turbines and generators have been based on conditions found in previous inspections, and the cost of material and labor required for these inspections.

### Scheduling

Since it is necessary for us to have each boiler out of service

each year, a tentative outage schedule is made early in January. Times allowed for each outage are based on repairs that must be made on the boiler. The turbines and generators scheduled for the year are also included.

Our system requirements limit outages on units above 15,000 kw capability to one portion of the year—March 15 through November 30.

When repairs are to be done on a boiler only, an outage of 2 weeks is allowed. Of course this does not include sufficient time for major repairs such as retubing a superheater or tubular air heater. In such cases an outage of length estimated to be sufficient for the work is scheduled.

If a turbine and generator are to be internally inspected, together with a boiler requiring normal cleaning and repairs, a period of 3 weeks is allowed.

We are now operating 11 high pressure boilers. No two of these can normally be scheduled for a yearly overhaul at the same time because of system load requirements.

There is a hidden cost during the outage of each high pressure boiler or turbine, because outage

of high pressure units necessitates operation of low pressure units. The differential in cost of a kilowatt when generated on a low pressure unit instead of high pressure is approximately 4 mills. If 400,000 kw must be generated each day on low pressure instead of high pressure units, there is a loss of \$1600.00 per day. It is easy to understand why we try to reduce outage time on high pressure equipment as much as possible.

Several years ago, we heard that E. J. Pearch, superintendent of one of the Florida Power & Light Company plants, was planning each outage in considerable detail. Our method generally follows his system and we realize that our progress in detailing an outage should be credited to his generosity in giving us the benefit of his experience. We still need more information on manhours required for repair and inspections of some equipment, but this is being accumulated on each outage.

### Advance Planning

Sometime before a scheduled outage, preferably 4 to 6 weeks, supervisors and foremen in the plant meet to detail an outage. Some members of the System Pro-



SUGGESTED OUTLINE FOR PLANNING SCHEDULED OUTAGE  
ON BOILERS AND GENERATORS

①

Plant \_\_\_\_\_ Scheduled Date of Outage \_\_\_\_\_

Time Allowed for Outage \_\_\_\_\_ days

Equipment to be Repaired.  
Details of Work and Personnel to Show on Sheet 2.

	Yes Or No		Yes Or No
A. Turbine		1A. Boiler	
B. Generator		1B. Service Oil Pumps	
C. Hydrogen Equipment		1C. Booster Oil Pumps	
D. Condensate Pump		1D. Service Oil Pumps	
E. Air Compressors		1E. Ducts	
F. Water Softeners		1F. General Piping	
G. Filters		1G. Air Compressors	
H. Strainers		1H. Air Receivers	
I. Reciters		2A. Structural Changes	
J. Switchgear		2B. Water Tanks	
K. Condenser			

Note: Repairs to piping and valves adjacent to each piece of equipment should be included with equipment. This includes expansion joints.

Auxiliary transformers and cable should be included with switchgear.

FORM NO. 1.

FORM NO. 3.

FORM NO. 4

③

EMPLOYEE ASSIGNED TO JOB		JOB DESCRIPTION	JOB NO.
FRI.			
SAT.			
SUN.			
MON.			
TUE.			
WED.			
THU.			

duction Department try to be present to assist in obtaining any material necessary or making arrangements for additional maintenance personnel. The plant personnel include the superintendent, assistant superintendent, chief electrician, master mechanic, and chief instrument mechanic. Several forms are used. The first one, designated as Form No. 1, is used to obtain a list of all equipment that would be worked on during the outage. This practically eliminates the omission of some equipment.

Form No. 2 is then partially filled out for each piece of equipment.

MAJOR OVERHAUL

④

Plant \_\_\_\_\_ Date \_\_\_\_\_

Name of Equipment \_\_\_\_\_

Date Work Started \_\_\_\_\_

Date Work Completed \_\_\_\_\_

Total Man Hours \_\_\_\_\_

Preliminary Estimate of Work to be Done \_\_\_\_\_

Condition of Equipment as Found \_\_\_\_\_

Work Done \_\_\_\_\_

New Parts Used (Give Part Number) \_\_\_\_\_

Changes Recommended \_\_\_\_\_

Men on Job	Total Hours	Men on Job

FORM NO. 2.

PRELIMINARY SCHEDULE ON DETAILED REPAIR OF EQUIPMENT

Plant \_\_\_\_\_ Outage Date \_\_\_\_\_

Equipment \_\_\_\_\_ Make \_\_\_\_\_

Estimated Time Required \_\_\_\_\_

Date for Work to Start \_\_\_\_\_

Material Required: On Hand To Be Obtained

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Personnel assigned to this work and duties:

Name	Duties	Sch. Shift	Over-Time
		1, 2, or 3	Time Req'd.
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			

No. Hours per Shift to be Worked \_\_\_\_\_

No. Shifts \_\_\_\_\_

No. Days per Week \_\_\_\_\_

②



ment listed on Form No. 1. Some of this information is not available until the other forms are completed.

### Personnel

It is then necessary to have a list of all personnel who will be available and their capabilities. The major jobs are first set up as to time and number of men required. For instance as soon as a boiler has cooled sufficiently, fire-side surfaces are cleaned. This requires 3 men for one day, no mechanics. It is then possible to schedule all mechanics for the first day on other equipment.

Suppose spacers are required in the superheater, 2 new expansion joints in the gas duct, 200 new tubes in the tubular air heater, and new diffusers on the oil burners. Probably 5 mechanics including 3 acetylene burners would be scheduled on the replacement of air heater tubes. Four days would be estimated for this job. In addition to the 5 mechanics, 4 men (not mechanics) would be listed to supply the new tubes as needed and dispose of removed tubes.

Other boiler work would be laid out as to time and men. After this information is completed on all of the Form No. 2 sheets, the list of available personnel allows each job to be scheduled as to starting date.

It is then possible to make out the maintenance work schedule on Form No. 3. This sheet has two uses—any conflict between two jobs is easily noted, and a complete picture of the work to be done is available. The jobs are first listed in the right-hand column headed "Job Description." This gives a number to each job. The names of all men available are listed in the spaces across the top of the sheet. Days of the week (for 4 weeks) are listed in the left-hand column. The number of a job is then listed under a certain man's name on the days he will work on that job.

### Unforeseen Conditions

This requires considerable time to juggle jobs, time and men to cover a 2-week or 3-week period. The major argument on this plan

is that there are usually unforeseen conditions that require either more men or more time than estimated, and this would disrupt the whole schedule. However this occurs in our normal work every day, but it does not change everything that has been planned. It may be necessary to delay one job, but the other jobs will progress as scheduled.

Another detail that gives trouble is designating each man for a specific job on a particular day. On the Form No. 2 sheets, we know how many mechanics or helpers are needed. There always seem to be too few mechanics for the work to be done, so it follows that nothing is lost by actually designating the men based on their capability.

### Permanent Record

After the Maintenance Work Schedule is completed, Form No. 4 is made for each job. These completed forms are given to the foremen who will be responsible for that work. During the outage, these forms will be completed to show all information on each piece of equipment and returned to the superintendent. This will provide a complete report on all work done, parts used that should be replaced, condition of equipment after a pe-

riod of operation, and manhours required. Future planning will be based on this information.

### Detailed Planning Pays

Although there is considerable work required in the preliminary planning of an outage, it has certainly resulted in more work being completed in less time than it required before we did this type of planning. It allows the men to know what work they will do ahead of time, thereby eliminating the delay between jobs. The foremen do not have to follow every job three or four times a day and worry about which job to do next. It also saves on time lost by putting too many or too few men on a specific job at the start. A look at the total actual salaries of all of the men used on an overhaul for one day will show how much the loss of  $\frac{1}{2}$  hour per day per man would cost. This is not considering the increase in outage of the equipment.

We are accumulating information on outages each year, and it is our expectation that within the next few years, outages can be planned and followed without any major changes. Our results have shown that this method has reduced outage time and cost.

## Low Maintenance Chipper Drive

THE H. D. Foote Lumber Company of Alexandria, La., is using a chipper to reduce butts, slabs and other waste lumber (from logs that have been debarked) to chips that are loaded into box cars and sent to a paper mill.

The drive for this chipper furnishes an excellent example of the low maintenance required by what the National Industrial Leather Association terms a Uni-Pull drive, consisting of a motor mounted on a tension control base and flat leather belt transmission, with short distance between centers.

A 900 rpm, 2300 volt induction motor is used with a fiber driving



pulley 32 in. in diameter and 19 in. face. The driven pulley on the chipper is 52 in. diameter and has a 19 in. face. A double flat leather belt, endless, 18-in. wide with Royal Chrome tan, is used for the transmission. The tight side of the belt is on top.

By FRANCIS A. WESTBROOK

Presented at Seventh Power Distribution Conference, University of Texas

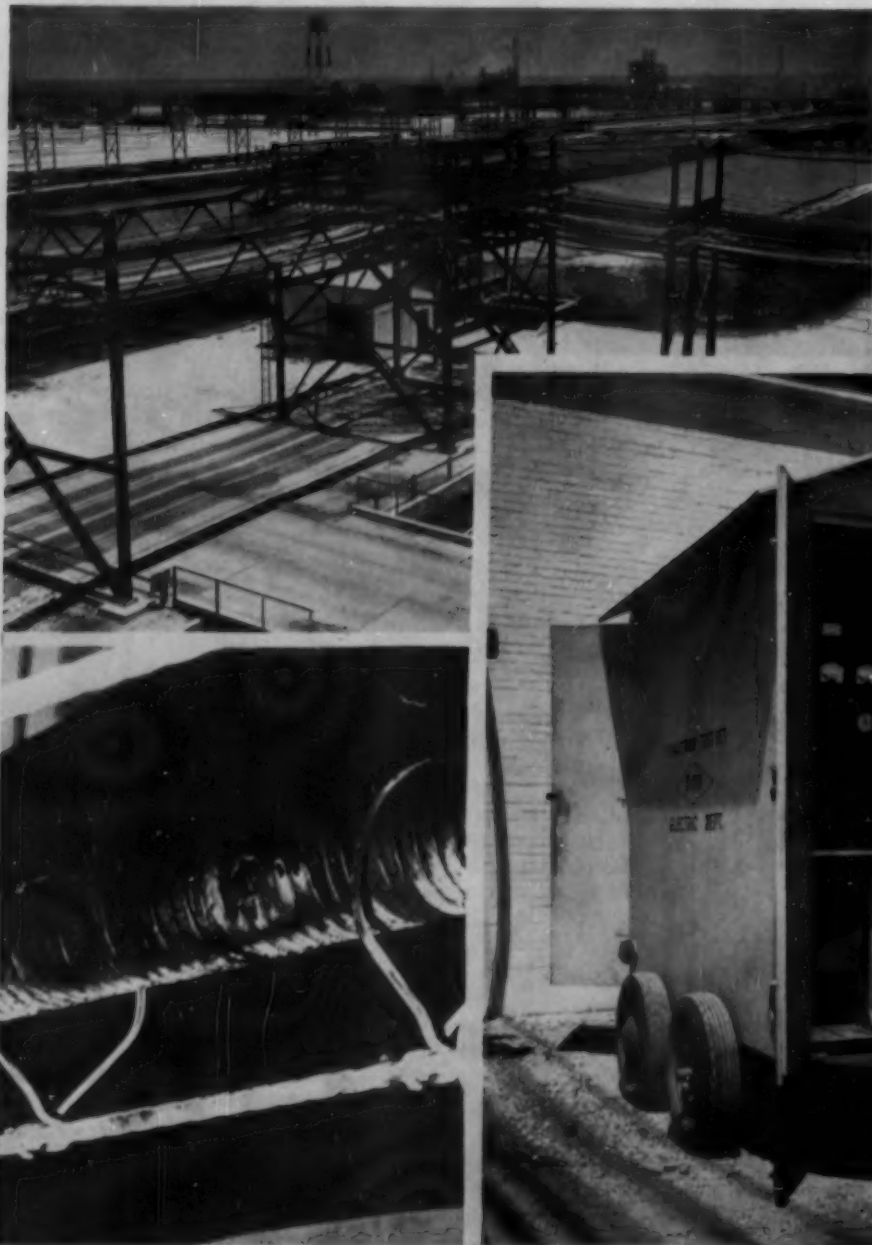
# High Voltage D-C Testing of Cables and

By **B. J. NANKERVIS**

Power Distribution—The Dow Chemical Company  
Texas Division—Freeport, Texas

**T**HE Dow Chemical Company has located at Freeport and Velasco, Texas, two large plants for manufacturing of chemicals and magnesium metal. Total power require-

Left—15 kv aerial cables at Dow Chemical Company, Plant B, Velasco, Texas. View is of main cable run and shows self-supporting steel corner structure.



Lower left—A typical phase to ground fault in an aerial bronze armored cable with 800 amp maximum fault current and nine cycle clearing time.

Below—50 kv direct current test set mounted in a four-wheel trailer for outdoor use.



# Cable Fault Location

ment for the plants is presently about 500,000 kw. This power is generated at Dow power plants and is distributed by a 15 kv power distribution system employing aerial cables. The cables, with only several exceptions, are varnished cambric insulated, non-metallic sheathed, protected with bronze interlocked armor overall. It is the purpose of this paper to discuss our experiences with high voltage direct current testing of the aerial cables, and methods used to locate cable faults.

## Need for Testing

The power distribution system has expanded so that the aerial cable system now has over 39 miles of 15 kv cables. This system has not been entirely free of electrical troubles. The 1940-1944 aerial cables had several failures in 1945. A few more occurred in 1946 and by 1947 two feeders, which had been out of service for several years and were then placed back in use, started failing too frequently.

Most of the failures were found to be caused by the absorption of moisture into the insulation due to defective jackets employed in the early cables.

The cable manufacturer was consulted and a direct current test set was made available by the City Public Service Board of San Antonio, Texas. The d-c test set was used to break down the weak sections of the two feeders that were giving trouble, and the sections that tested satisfactorily were combined to make one feeder. This feeder did not fail again in 1947 and operated until replacement cable could be obtained and installed.

## Method of Testing

As a result of this test experience, The Dow Chemical Company purchased a d-c test set in 1948. This set is a half-wave rectifier with a capacity of 100 milliamperes and a voltage of 50 kv, but is not

designed to deliver rated current and voltage at the same time. The test set is mounted in a house on wheels. In the six years the set has been in use, over 1000 tests have been made on cable.

For several years tests were made only after a cable had failed, and to test the repaired cable before returning it to service. The tests were found to be of such value, however, that all new cable installations are now given an acceptance test before placing in service; and, when possible, cables are given an additional proof test once a year.

In the early testing it was deemed advisable to disconnect cable terminations from current transformers and switchgear before making d-c tests. This required considerable taping time before and after the tests, and we have since decided this is not always necessary. We no longer disconnect current transformers or switchgear before making d-c tests at 30 kv unless the equipment can readily be disconnected by means of switches.

The test voltage used for 15 kv grounded neutral varnished cambric insulated cable has until this year been 30 kv d-c for new and old cables. Recently we started making acceptance tests of new cable at 35 to 50 kv d-c, depending on the manufacturers' recommendations. This test is made for a period of 5 minutes and the leakage current carefully noted during the test.

A number of factors influence the amount of leakage current that will be measured on a cable and a number of excellent papers have been written on this subject.

With a good cable we have found that a slight decrease in leakage current will occur during the first several minutes of test and the current will then hold steady for the last minute or two of test. With a poor cable the decrease in current may not occur, and cables in which an increase in current occurs dur-

ing the test are usually sure to fail on further testing.

It is this increase of leakage current that we watch for. On many poor cables the leakage current may be steady for several minutes and then fail with no noticeable rise of current before the failure. The five minute period seems to be a minimum test time for picking out defects.

## Examples of Defects

In addition to cable defects we have found troubles in potheads, splices, and switchgear when making d-c tests. The following cases are examples of failures found by means of d-c testing:

1. A substation feeder breaker opened due to ground relay action. The feeder was re-energized and stayed energized. On March 8, 1950, the feeder was removed from service for testing. Insulation resistance at 2500 volt and corrected for temperature and length was 7.4, 9.0, and 21.4 megohms. The feeder was then tested with d-c and broke down at 20 kv. The trouble was found in a splice. Compound from the splice sealed the fault so that location of the fault would have been difficult to find without a high test voltage.

2. An acceptance test of 3, 1/c, 2500 MCM, 15 kv cables 3150 feet long was made. Insulation resistance, not corrected for temperature or length meggered at 2500 volts was 43, 43, and 46 megohms. On d-c test, X phase broke down at 15 kv. Y and Z phases checked 0.87 and 0.75 milliamperes leakage at 30 kv. The X phase fault was found to be a small hole, apparently caused by rolling the reel of cable over a protruding nail during construction.

3. An acceptance test was made of 3, 3/c, 700 MCM, 15 kv cables 4345 feet long. The Z phase of one cable section failed during the 5-minute test. Failure was found to be not far from a pothead. It was due to rough handling of the cable during installation.

4. A pothead at a rectifier station was repaired due to an oil leak. On test, one phase of the cable failed at 20 kv d-c. The failure was found to be in the pothead and was due to overheating while melting out the compound. The cable was reinsulated and the pothead remade.



## High-Voltage D-C Testing of Cables (continued)

*"We have found high voltage d-c testing to be of considerable value for acceptance testing of new cables and routine testing of older cables.*

*"By means of this testing we have found cable and termination defects that were repaired during planned shutdowns. Had these defects not been found they could have caused power failures that would have been more difficult to repair and could have been very costly due to loss of production."*

On the next test the cable broke down again at 20 kv. The failure was 2 in. below the pothead and was caused by overheating the insulation while soldering the cable armor.

5. An acceptance test of 3, 3/c, 700 MCM, 15 kv cables 6600 feet long was made. One cable failed at 17,000 volts d-c. The trouble was found to be due to a manufacturing defect.

6. During routine inspection of a substation three, 5 kv, 50 foot vertical cables were found to have high leakage on d-c test. The trouble was found to be due to defective workmanship when the outdoor potheads were made. The substation was 1½ years old at time of test.

7. During inspection of a substation high d-c leakage was obtained on test of transformer cables. It was found that water had stood several inches deep at various times in an air-filled pothead compartment and had leaked through a pothead into the cable. The defective cable was replaced and drain holes drilled in all similar pothead compartments. This substation was eleven years old at time of test.

### Evaluation of Tests

The purpose of most cable tests is to determine the condition of the cable. With new cable we have had little difficulty doing this, because a defect (when encountered) is usually found in one location and

the rest of the cable will test good after the defect has been removed.

As cables age, the need for evaluating the condition becomes more necessary and more difficult. Power factor testing is an accepted test for evaluation of cable. However, our cable sizes and lengths and design are such that we question the ability of this test to give the information needed, since the results are an average value for an entire circuit and give little indication of a weak point. Nevertheless, we have started making power factor tests on short cable sections removed from service as an additional guide to the condition of the cable.

After reading of the experiences of others with d-c testing, we started keeping graphs of each cable leakage current. The condition of a cable can be estimated by comparing the leakage currents over a number of years. The leakage current should not change appreciably from year to year; however, allowances must be made for different cable temperatures at time of test.

### Fault Location

A number of devices and schemes have been developed to simplify the problem of fault location. With aerial cables and slow relay clearing time it is no problem; one or more of the conductors will have extensive damage at the fault and can be found by patrolling the line. With fault clearing time of the order of nine cycles the damage

will be small and cannot readily be found.

Following a cable failure we patrol the line and look for a smoked spot. If this does not reveal the trouble, the high voltage d-c test set is connected to the cable and used to carbonize the fault and thus lower its resistance. We then use the condenser discharge method for locating the fault.

This is a well known method in which a spark gap is set to control the discharge of a condenser through a cable fault and to ground. The discharge across the fault will cause a loud noise that is effective about 25% of the time for location of the fault.

When this is not successful, we connect three 5 kva transformers between the cable and ground and burn the fault until it starts smoking.

We believe that better methods of fault location are in use and we are in the process of investigating this further.

### Safety Precautions

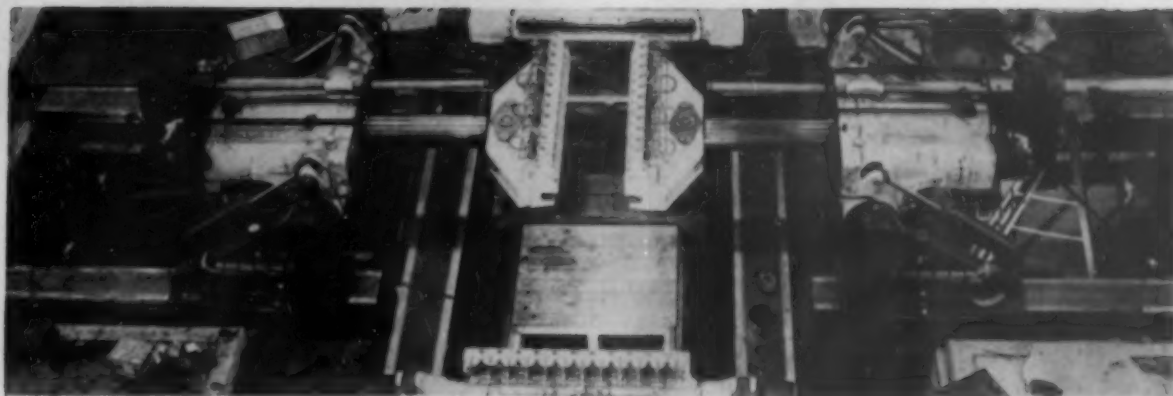
With high voltage testing considerable care must be exercised to protect personnel and equipment. After obtaining clearance from our power dispatcher we place a man at each end of the cable to stand guard and prevent anyone from working near the terminations.

Provision has to be made for at least four inches air gap around the bushings under test to prevent an arc from jumping to other equipment and making other circuits hazardous to personnel and also causing equipment damage due to over voltage.

After the high voltage test has been completed, a ground is placed on the cable conductors and left for five minutes or longer. If this is not done the voltage of a cable conductor may build up to dangerous value after being discharged for only a short period.

Following a splice or pothead job, care must be taken not to apply a high test voltage until the compound has cooled sufficiently. At elevated temperature the insulating compounds we use have low dielectric strength and we have had several failures from testing while the insulating compound was too hot.





## Piping System on Giant Press Repaired Without Dismantling

By F. C. CLAYTON

Chief Plant Engineer  
Convair, Fort Worth, Texas

A NEW 750 ton Sheridan sheet and extrusion stretch press (one of the largest machines of its kind ever built) was recently installed at Convair, Forth Worth, Texas. It is capable of handling sheet stock up to 6 ft x 20 ft size and extrusions up to 22 ft in length. Capacity of the main ram is 750 tons; longitudinal jaws, 200 tons each; and transverse jaws, 375 tons.

After installation and during trial runs a malfunctioning valve system caused a hydraulic "hammer" to develop which caused leakage in most of the 2000 plus joints in the piping system. The press was piped on the job with extra heavy steel pipe and fittings to handle the 3000 psi working pressure. Pipe sizes range from  $\frac{3}{4}$  in. to 2 in. and consist of a maze of

short lengths, joints, nipples and couplings. The major portion of the piping is  $1\frac{1}{2}$  in. and  $1\frac{1}{4}$  in.

When the problem of the hydraulic hammer had been solved, there remained the problem of stopping the leaks. The pipes had been filled with oil, which had penetrated all the joints. To completely clean in place seemed impossible. To disassemble and replace would take three months and cost thousands of dollars. The machine was needed in production in two months.

### Brazing Technique

Plant engineers decided to braze the joints with low temperature brazing alloy. However, any scale from burnt oil in the joints or pipe being brazed might damage the close tolerance parts of the press. A laboratory test was made to determine the effect of brazing pipe that was just drained of oil, then of brazing it with the pipe filled with inert (Argon) gas.

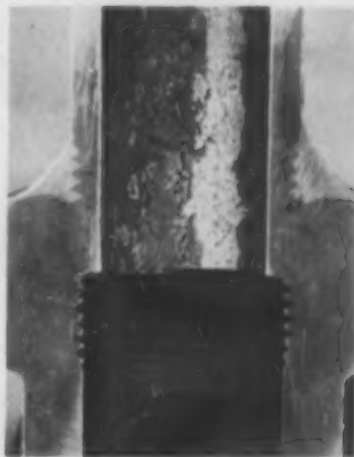
One of the photos shows a sample of a pipe joint brazed after being saturated with oil, drained, then

Some 1500 to 2000 joints were brazed, requiring six weeks time and 2400 man hours.

► Sample of a pipe joint brazed after being saturated with oil, drained, and then filled with Argon gas without any cleaning. Braze metal made a complete bond with both pipe and fitting.

filled with Argon gas without any cleaning. No scale was formed, and the braze metal made a complete bond.

As a result of the test, this method was adopted. To assure complete drainage, the bottom of the pipe loops were drilled, then later brazed. The entire hydraulic system was kept full of Argon at all times. Some 1500 to 2000 joints were brazed, requiring six weeks time and 2400 man hours, including miscellaneous work and services. In accomplishing the work, some pipe and electrical wiring had to be removed in order to reach some of the pipe joints. A conservative estimate indicates a 50% cost saving for the job as done compared with complete replacement of the piping system.



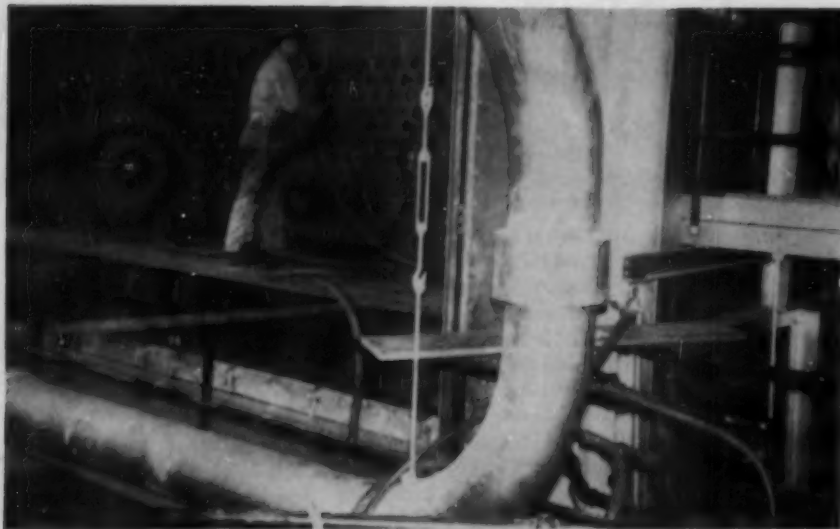
# Preventive Maintenance Pays

## Arsenal Hill Plant Completes Over 25 Years Service

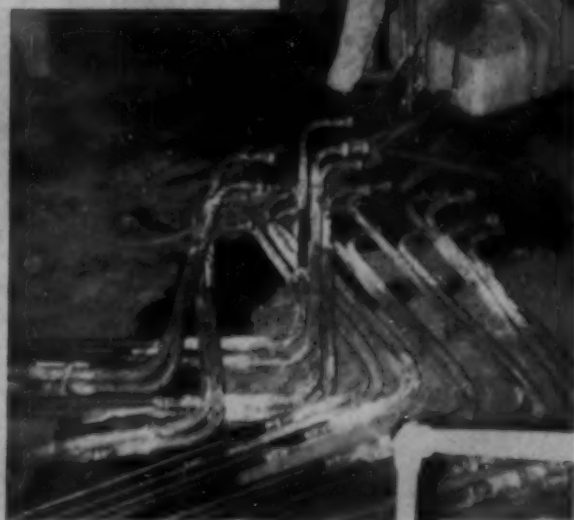
By R. S. MONCRIEF and JOHN O. HAYTER

Southwestern Gas and Electric Company  
Shreveport, Louisiana

THE history of Arsenal Hill Power Plant dates back to 1926, when the first steam turbine was installed. This was a 10,000 kw, G-E condensing steam turbine with a battery of three Heine cross-drum boilers, each having a capacity of 80,000 lb/hr. These boilers were equipped with Elesco



◀ Turbining boiler tubes in 80,000 pound per hour boiler



▲ Placing a hydrostatic test on a radiant superheater tube

◀ Section of new superheater tubes in 80,000 pound per hour boiler

## Louisiana Plant Operated 33 Months at Average Capacity Factor of 109%

convection superheaters and operated at 265 psig and 100 F superheat.

Early in 1927 two more 10,000 kw, G-E condensing steam turbines, and three more 80,000 lb/hr boilers were installed. The boilers were Springfield cross-drum, sectional, all steel, water tube type with operating conditions of 275 psig. These boilers were equipped with Elesco convection superheaters.

In 1927 it was further decided to add radiant superheaters to bring the steam temperature up to 650 F. These radiant superheaters were purchased from The Superheater Company and installed in all six of the boilers. (See Fig. 4)

By 1938 the electrical load had increased to such an extent that a 15,000 kw, G-E condensing steam turbine with two more 80,000 lb/hr Springfield boilers were added. These boilers were designed to operate at 265 psig and 690F. With the addition of this unit the plant reached its maximum name-plate rating of 45,000 kw.

### Maintenance

Throughout the years preventive maintenance has been practiced by inspecting the boilers each year. These inspections have caught many troubles before they developed into serious difficulties.

The maintenance schedule calls for each boiler to be inspected and overhauled thoroughly each year. The schedule includes the following:

1. Clean the headers and turbine the tubes if necessary (see Fig. 1). One of the newest devices which is used in determining whether there are deposits in the tubes is a Turner Scale Thickness Indicator. This device is pushed through the tube; and as it rolls through, it registers a deflection if there is a variation in the wall thickness of the tube. The degree of this variation will tell how

much deposit, if any, there is on the tube.

2. Inspect the internals of the boiler.

3. Check, overhaul and repack all external valves.

4. Check the boiler drum and give it a coat of Apexior paint.

5. Inspect the burners and wind-box.

6. Check all boiler gauges and recording instruments and repair any that are not operating satisfactorily.

7. Install new handhole and man-hole gaskets.

8. Place a hydrostatic test on the boiler and check for superheater tube leaks.

9. Inspect the furnace walls and make any needed repairs.

### Repairs

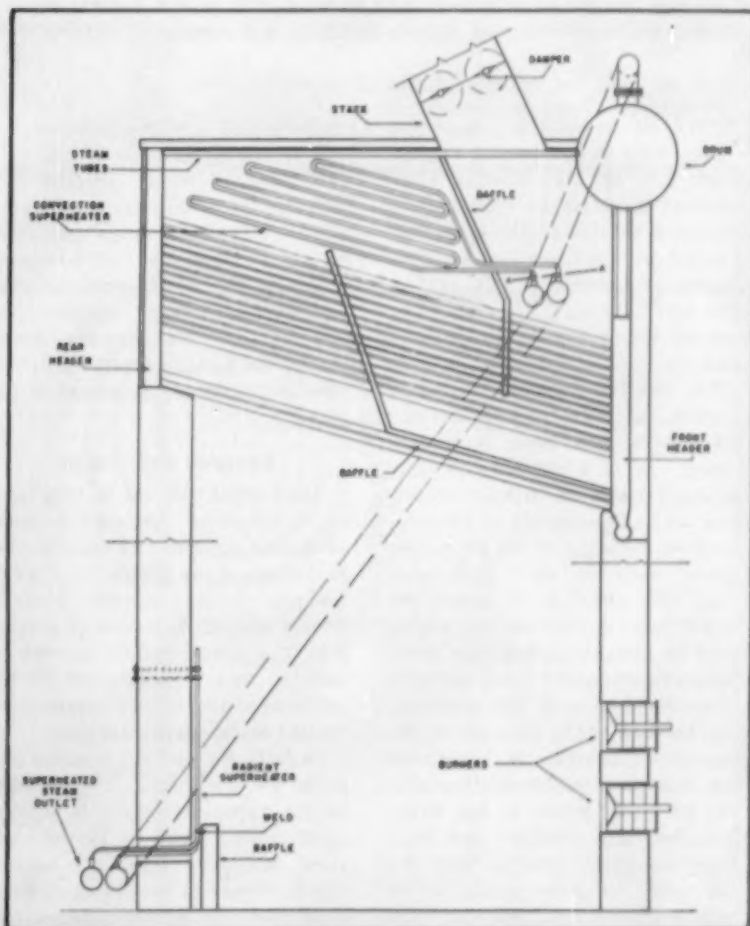
Recent repair work has consisted of replacing part of one of the inside walls on one of the older boilers. This work required tearing out the old wall, replacing the wall brackets and rebuilding the wall with one course of 4" x 9" fire brick and a 9" wall of a plastic refractory. This was done in 1953 at a cost of approximately \$7.57 per sq ft.

### Convection Elements

After 28 years of service some of the convection superheater elements have begun to give away in the old boilers, and it has been exceedingly difficult to repair

(Continued on page 76)

80,000 lb/hr boiler showing arrangement of convection and radiant superheaters



# Production Equipment Maintenance

**By C. V. HOGAN, Tool Engineer**

R. G. LeTourneau, Inc.  
Vicksburg, Mississippi

**E**VEN though many articles deal with maintenance and preventive maintenance as separate topics, we shall look at both subjects as one and the same in this article and combine the suggestions under the heading of "Maintenance of Production Equipment."

Maintenance is a problem that has been with us since the beginning of time and has been dealt with in various and sundry ways. Industry as a whole, however, still insists on minimizing the importance of the topic and others look upon it as a necessary evil.

Let us open our minds to the problem of maintenance as a rich source of profit to our respective manufacturing organizations for it still holds that "a dollar saved is a dollar earned." Please accept the following suggestions with the knowledge that the writer is well aware that a production organization can become so saturated with systems that it will become waterlogged and the efficiency of the organization will inherently suffer.

**F**IRST let us look at the company who owned twelve engine lathes. Let us also assume that eleven of these lathes were giving very good service to the company in question. However, let us also assume that the twelfth engine lathe was causing quite a disturbance in the maintenance department.

The twelfth engine lathe in question, at least to the maintenance boys, has been termed a "lemon" as is sometime the title bestowed upon machinery which gives an undue amount of trouble. However, because of the reporting system used in this particular plant, this problem is never reflected into dollar values which could be brought before the management's attention for a decision on the disposition of this machine.

At the end of the year the maintenance supervisor is convinced that if he had substantiating records he could prove to his superiors that this machine has been giving so much trouble that the wise move to make would be to get rid of the machine and pos-

sibly replace it with a new one.

It is not uncommon to run into these conditions in present day industry. It is also not uncommon to find that the average manufacturing organization of today is prone to take with a grain of salt, so to speak, word of mouth reports and casual conversations about the performance record of an individual piece of equipment in the plant.

## Records Sell Facts

Then what are we to do? Generally speaking, contrary to word of mouth reports and idle conversation about the problems of maintenance, factual records seem to have a way of their own of getting into the right hands. So let us assume that the solution to the problem would lie in a simple controlled maintenance system.

In setting up a maintenance program we shall look first at some of the things we wish to accomplish under such a system and then devise a system to provide the information necessary to make economical and speedy decisions.

► **First**, the system should be devised to cover maintenance records of individual machines, and not merely of production departments or groups of machines. If possible, the system should reflect very closely the listings of the property records. Possibly the records should even become a part of the property records.

► **Second**, even though the cost of maintenance ultimately becomes a factor of overhead, the records should show a finalized picture of maintenance costs as related to a particular machine over a given time.

► **Third**, a system of shop reporting that is simple and accurate is mandatory to the records and should be devised to reflect facts without duplication of effort in keeping the records.

► **Fourth**, a preventive maintenance program should be incorporated in the records as a necessary part of the maintenance program and should reflect in the cost of the individual machine records a cost of its own.

► **Fifth**, maintenance records should portray a clear picture to interested individuals charged with the responsibility of controlling the cost of maintaining the machinery.

► **Sixth**, it is mandatory that a minimum amount of paper work be involved in the system and that the necessary paper work be concise and simple.

► **Seventh**, the system should in no way impair the speed of repairing equipment in the shop, nor should it handicap the Production Superintendent charged with the responsibility of meeting production schedules.

Perhaps you can think of other things that your particular application should include in the system. However, let us go on with satisfying the seven units of ac-



complishment under an actual system.

### Numbers and Records

It is evident in the beginning that each piece of manufacturing equipment in the plant should be numbered and these numbers should be reflected throughout the system. A suggestion for machine numbers is to emboss the number on a strip of steel or other material and fasten this number in a conspicuous place on the machine.

After installation of the number on the machine, the same number should be applied to that particular machine in the property records. Weekly performance cards should be attached to each machine and should reflect any visitation to this machine by any member of the maintenance staff whether the visit be for repair or preventive maintenance. The visit should also be reflected in the daily job card of the individual

making the visit. A suggested form for use as the weekly maintenance record card is presented.

It can be observed that space has been left on the back of the card for pertinent comments from the maintenance department. The preventive maintenance program is also separated from actual maintenance under "Cost Summary." This will enable interested individuals to determine whether the preventive program is actually accomplishing its goal. The grand total will show weekly costs of all maintenance activity in a simple but factual manner.

### Simple Paper Work

It can be observed by a short study of the card that any member of the maintenance or preventive maintenance crew who is called on to service this machine, on completion of the job, could then fill out the card.

Assume that the maintenance

department had been asked for a mechanic to repair the cross feed screw on a standard engine lathe. Then, after completion of the job, the procedure would run something like this:

First, he would select the number from the column titled "Reasons for Visit" (in this case—No. 9) and insert it in the lower column under "No." Also, if parts were replaced, the number "11" would be inserted along with number "9." The time involved would then be listed under "Time Spent" and after this comes the man's name.

Then, because there were parts replaced, the man would turn the card over and list the numbers of the parts replaced, under the title "Material."

At the end of the week the maintenance clerk, or any designated individual, would take up the cards and replace them with

(Continued on next page)

• 1 5 9 •

**A METAL NUMBER TAG** is fastened to each machine.

**WEEKLY MAINTENANCE RECORD** is kept on one card for each piece of equipment. Front and back of a sample card are shown below.

WEEKLY MAINTENANCE RECORD CARD				COMMENTS	
WEEK ENDING _____					
MACH NAME _____		PROPERTY N° _____			
<b>REASONS FOR VISITATION</b>					
1	ROUTINE CHECK-UP	14			
2	OIL	15			
3	WIRING (ELECTRICAL)	16			
4	MOTORS	17			
5	HYDRAULIC	18			
6	AIR	19			
7	WATER	20			
8	GAS	21			
9	MECHANICAL FAILURE	22			
10	PREVENTIVE ACTION	23			
11	PARTS REPLACED	24			
12		25			
13		26			
N°	FULL NAME	TIME SPENT	N°	TIME SPENT	
TOTAL			TOTAL		

COST SUMMARY			
PREVENTIVE MAINTENANCE			
LABOR		MATERIAL	
TOTAL		TOTAL	
MAINTENANCE			
LABOR		MATERIAL	
TOTAL		TOTAL	
GRAND TOTAL		GRAND TOTAL	

cards for the coming week. The cards are then totaled for maintenance time spent and passed on to accounting or to the property man.

The property man could then compute total weekly cost of maintaining the machine and enter this cost figure under "Total" on the back of the card. It would then be possible to project this informa-

tion into an annual or semi-annual report showing the maintenance activity on each machine.

#### Variations Are Easy

Under a simple system such as the one outlined above, there would be many possibilities that could be explored and modifications to fit a particular problem

are possible. It is not the intention of the writer to recommend a cure-all to maintenance problems. It is the intention, however, to awaken some unsuspecting individual to the possibilities for profit in bringing to light and correcting maintenance problems through a simple, efficient and economical maintenance system.

## Care and Maintenance of POWER TRANSMISSION BELTING

### "Do's and Don'ts"

Data Courtesy of THE B. F. GOODRICH COMPANY

#### Flat Belting

##### DO:

Store roll upright and off the floor, supported by a shaft through the core.

Store in a cool, dark, dry place.

Keep roll tightly wrapped as received from the factory. Remove only enough belting for immediate needs.

##### DON'T:

Place roll on its side on the floor. Any moisture there will be absorbed principally by the one belt edge, resulting in a crooked-running belt.

##### DO:

Check alignment of the pulleys. This prevents both excessive surface wear and edge damage.

Use pulleys with a face width at least one inch greater than the belt.

Clear away all possible obstructions that could snag the belt edge.

##### DON'T:

Have too high a crown on the pulleys. Maximum normal crown is  $\frac{1}{8}$  inch per foot of face.

Let oil or grease get on the belt. Use oil guards or grease seals.

##### DO:

Keep belt under proper tension—the minimum tension needed to prevent slippage.

Make careful checks during the first hours and days of operation. Most of the stretch occurs then—usually three to four per cent take-up is needed.

Keep belt clean. Use only recommended solvents—50 per cent ethyl (grain) alcohol, 50 per cent carbon tetrachloride—for removal of oil or grease.

##### DON'T:

Allow build-up of belt dressing on either belt or pulleys.

Use belt dressing at all if avoidable. If you must,

use a liquid dressing least damaging to rubber compounds. Consult the belt manufacturers. Castor oil is approved. Never use rosin.

##### DO:

Use vulcanized splices wherever possible. They provide greater flexibility, reduce snapping, keep moisture out of the carcass by eliminating cut ends, are stronger.

##### DON'T:

Use anything but vulcanized splices where reverse bend idlers are used.

#### Multi V-Belts

##### DO:

Provide enough belts of the correct section to carry the load.

Provide sufficient take-up on the drive.

Make sure sheaves are in proper alignment.

Replace badly worn or damaged sheaves.

Keep sheave grooves clean.

Keep belts free from oil and grease, and away from direct sunlight.

Provide enough clearance between belts and guards around the drive so that the belts can sag a little without rubbing.

Store belts in a cool, dry, dark place.

##### DON'T:

Pry or force belts into grooves—release the take-up or remove the sheaves.

Tighten belts any more than is necessary to remove slack.

Use belt dressing on V-belts.

Replace only one or two worn or damaged V-belts in a set. Replace them only in complete matched sets.

Use V-belts on sheaves smaller than recommended in industry standards.

Use belts of different manufacture together.

Allow shock loads on a V-belt drive.

# NOW IT'S OUR TURN

By (OF ALL THINGS!)  
Two Maintenance Foremen

**T**HE INDUSTRIAL field has grown like children—through phases (mechanization phase, labor organization phase, efficiency expert phase, operations improvement phase, human relations phase, industrial engineering phase and others) to get to the current phase—*Plant Maintenance*.

Whether our present maintenance be slap-happy, preventive, engineered, or contracted—this phase has gone through the rigors of its forerunners. We have had reports by economists, business administrators, managers, personnel directors and consultants—while being missed, perhaps, by only the clergy and maintenance foremen. We propose to represent the latter (the foremen). After all, who should be the last to be heard from? We leave that question to the clergy.

**I**N A more serious manner we should like to present firsthand maintenance data that we believe is proving effective in one industrial plant in one industrial field.

Before any maintenance plan can be put into effect for a given plant, consideration must be given to the type of operations, physical size and attendant factors, labor policies to be encountered, and limits of maintenance and/or service scope of duties. Then the establishment of records for their particular significance to that plant can be worked out.

## Responsibilities

Responsibilities of Maintenance are to keep Management informed as to general condition of equipment, faulty equipment, abuse of facilities and recommendations for improvements in addition to their sheer maintenance duties.

Perhaps there is one old saw that every maintenance man wishes were dead and buried: "We are in business to produce products for sale—not to make work for maintenance people." 'Tis true, no buts! With this view accepted by all departments, it then behooves those departments to co-operate and coordinate with maintenance rather than have work done "in spite of maintenance."

With a general set-up of main-

tenance and service there are different degrees of maintenance. Sheer preventive maintenance is a non-descriptive term about as specific as referring to a liquid fluid. Each executive has his ideas as to its definition and limits.

Then there is the urgent maintenance needed to keep the plant operable. This can come from irregularities, such as freeze-ups, loss of power, spills, wrong valve-twisting and it can kick a planned scheduled program right under the table. Therefore allowance must be made for emergencies.

The routine maintenance resulting from fair wear and tear will happen no matter how zealously preventive maintenance has been followed. Also inevitable are the progressive jobs, such as rerouting lines, relocating equipment, making minor revisions, getting ready for shutdown and some hundred more.

Included in the miscellaneous category are scheduled disruptions such as meetings to be attended by maintenance personnel, "to-be-done-yesterday" projects for sales department, research or pilot plant operations, and management desires.

There are seasonal maintenance jobs: grass cutting, snow removal, high-low water problems, and wind damage. Continuing maintenance

**THE AUTHORS**  
This article was prepared by two men who are directly responsible for maintenance at the **WILLIAMS PLANT** of **KOPPERS COMPANY** at Port Arthur, Texas.

**J. W. HOUSE** is the Assistant Maintenance Departmental Foreman.

**J. P. CASSIDY** is Maintenance Departmental Foreman.

Mr. House attended Tennessee University, and Mr. Cassidy attended Tulane University.

must be done on roads, levees, sewers, vehicles, painting and buildings.

## Records

Now, we can get down to the preventive maintenance jobs such as routine inspection, lubrication and parts replacement.

To begin to set up a scheduled maintenance program, flexibility must be the keynote. This creates a semiparadoxical situation. But so is life.

Records and paperwork form the historical background of maintenance, particularly preventive maintenance.

The first and most vital data in modern plants are manufacturers' specifications, operating manuals and parts lists. A good indexed file of all purchase orders can expedite many maintenance jobs.

A complete set of plant drawings is considered a good convenience, if available, but not a necessity.

Identification is a prime requisite for preventive maintenance. An item number method of identification (including classification by blocks of numbers) is excellent to follow a given piece of equipment. This item number should be geographical, meaning that the



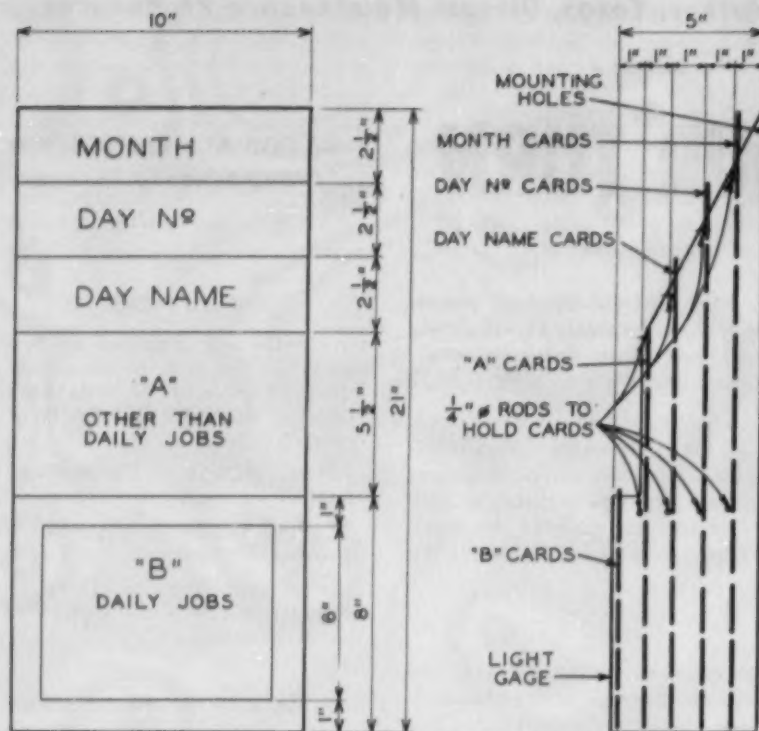


Fig. 1. Perpetual calendar for maintenance.

serial number can be changed and record made on item replacement or salvage.

### One Card System

This is not enough. To codify these sources of information a one-card procedure can be utilized, indexing by item number.

1. CLEAN HOSE HOUSE 2. LADDER INSPECTION 3. CHECK CHAINS, CHAIN VALVES 4. INSPECT DRUM DUMPER 5. REVIEW TEST SAMPLES, LOCATIONS
THIS SPACE COVERED BY "B" (DAILY) CARDS
PENCILLED NOTATION <i>Monthly, August 1955</i>

Fig. 2. Actual card used "A".

Preferably a blank card should be used, because a printed card made for all items of equipment is all inclusive and thus provides good space that is not applicable. Hence, we recommend the one card, blank, say 8" by 5".

On the card can be listed the item number (also serving as index number), specifications, purchase order, price, plant name of equipment, and a general summary of data that is useful for permanent record.

If an item changes because of design or for other reasons, another card can be stapled to the

1. INSPECT CHLORINATORS 2. CHECK TOILETS 3. RING-OUT FIRE ALARM BOXES
PENCILLED NOTATION <i>Monday</i>

Fig. 3. Actual card used "B".

front of the retired card showing its pertinent information. A duplicate item card in the same small file can be blank for penned or penciled notations. This card may fill up astonishingly fast in some instances, but still should not overwork the old stapler in adding cards.

### Maintenance Request

How to get the data for the blank card must be answered. We must pick up another form, the maintenance request. Here the department or operating unit concerned writes the authorization to perform maintenance. Item number is shown. Accounting numbers for the work are listed. The work is done.

Upon completion, the request is turned in by the maintenance man with total classified manhours listed. If materials were required for the job, the request number is listed on the storeroom requisition (or purchase order) for future accounting, if such luxuries are available. If the job performed is of notable magnitude, then entry is made on the blank duplicate item card aforementioned.

For preventive maintenance work that can be covered by a blanket request, this procedure saves time and paper work as compared with writing individual requests for each minor job.

Maintenance requests may be filed by the system best suited for each plant: by crafts, by equipment, urgent, safety, shutdown, rainy day, routine, etc. Here the maintenance personnel can use a butcher book for penciled notation. Occasionally these butcher books can be picked up, and notable maintenance data entered on the "blank" record card. Soon we find the record card is no longer blank; it becomes a factual history, easily and quickly made.

### Perpetual Calendar

Remembering is the stubborn little "IF" in all scheduled and planned maintenance. How to remember when? Desk and wall calendars last only a year.

A perpetual calendar serves as a spicy memory aid. Simple, lasting, extremely flexible, and like



the little bird—CHEEP!

To suggest a perpetual calendar of specific dimensions see Figure 1. The cards are made of white cardboard with the notation for days, and months on each end and both sides—to use less cards. (Another function of Maintenance: whittle off the useless.)

### Cards Tell Story

Cards for pocket A, see Figure 2, are for scheduled maintenance other than day to day jobs. Cards in pocket B, see Figure 3, are made for each day of the week required.

In the system in use, four days are utilized, leaving one for emergencies and future scheduled work. Week-ends are not worked by maintenance, normally.

Back to what goes on the cards. Data is predicated on previous experience—lots of it—either knowledgeable or from itemized history. It must first be collected in notes and carefully arranged before making the cards in order that a balanced yearly program can adequately care for equipment without overloading mechanics at given intervals. And watch the load for those vacation periods. Penciled ticklers at the bottom are the key and can be changed readily if experience and overloads become evident.

Here are some of the pay-offs. Only seconds are required to shuffle cards daily. While shuffling cards any immediate future work that requires coordination with another department is observed and sufficient time allowed for coordinating.

If most of the scheduled work is preventive maintenance, weekly, monthly, or other blanket maintenance request suffices. If special work or coordinated work is involved, then a request can be issued ahead of time for the job.

If experience proves different than that recommended on the card, either that card can be remade, quickly, or that notation crossed off the card and possibly added to another. Use of ink for lettering tends to provide legibility and permanence.

### Who Does It?

The question that presents itself at this point is who does all

this card shuffling, entry making on equipment cards, and maintenance request sorting and filing. In a small plant it could easily be the foreman.

If indeed he had to work like crazy to get his perpetual calendar devised, he would be on gravy time after it was properly functioning.

His system should be just as simple for keeping those headache records on special assignments, call-outs, overtime, meetings, etc. How?

Get an accounting book with as many lines per page, at least, as the number of maintenance personnel. Tab the book with records to be maintained. List each man in applicable section. Then, there in one quick glance is a history—requiring only a brief time per entry.

### And What Else?

We have shown maintenance jobs, preventive scheduled engineered maintenance, and records, but what is missing?

Two concepts must be weighed in approaching every maintenance job. First every maintenance job must be viewed with an idea of how to prevent its recurrence. Next, getting it done fast and cheaply.

A simple maintenance item may be overlooked unless records are reviewed. Carefully establish man-hours, tools required and dates of execution for every job. Misery

can result from neglect. But it is not necessary in approaching every job to engineer it to death, or to make it "rounder."

Simplicity—not complicity—must be the view to take in use of manpower, technical skill and record keeping. What, indeed, would be gained if two clerks with huge rafts of paperwork, could replace two mechanics? Each plant must decide for itself.

### Good Performance

To keep maintenance costs low, provide sufficient records and utilize available facilities, are problems of each plant's maintenance department. In general, broad answers to "So what? What can this article do for me?" may be summarized:

1. Unitize maintenance insofar as practical.
2. Maintain maximum of 2 levels of supervision per unit.
3. Keep records as few and simple as possible.
4. One level supervision calls for no clerk.
5. Two level supervision asks for typing help.
6. Three level supervision indicates need for a clerk for maintaining suitable records.
7. Make use of each maintenance employee in helping to bring in record data.
8. Pass the buck to accounting department, if possible, for making job cost records. Maintenance is primarily to do work and make records available for others to do cost accounting.

## Padlocking Switchboxes Protects Maintenance Men

AS A means of reducing industrial accidents, maintenance men should padlock control switchboxes while they are repairing industrial equipment. For maximum safety, Master Lock Company recommends that each man carry a padlock which only he can open. The device illustrated permits up to six men to "lock out" the same switchbox, making it impossible for power to be turned on until all men have finished their work and given clearance. This practice is endorsed by the National Safety Council to prevent accidents.



## Substitute Contact Discs Increase Life of Electrical Control Points

By DORSEY B. THOMAS

Mechanical Maintenance Department  
Union Bag & Paper Corporation, Savannah, Georgia

IN INDUSTRIES the size of Union Bag & Paper Corporation's Savannah Plant, material handling is a major problem. We use one hundred and fifteen electrical fork lift trucks as a part of this operation.

Through routine repair and maintenance records it was obvious that the over all cost for keeping the electrical control points on these trucks in operating condition was far above what is considered reasonable for this operation. One type electric truck that we use carries a set of points containing eighteen contactors. The points, as sets, were received with the alloy contact disc mounted on the copper bars with silver solder (as shown

in illustration). The average service life of a set of these replacement points, in a twenty-four hour operation, is from one to three weeks. The continuous arcing would melt the contact disc and fuse (weld) them together.

### Discs Replaced

In view of these circumstances, our first thought was to find an alloy with a high melting point and electrical conductivity sufficient to carry the required current. Since the copper bar does not wear out, we decided to experiment with replacing the disc only. We secured discs of two different types of alloy, tungsten silver and molybdenum silver. When the substitute disc

demonstrated a service life considerably above that of the replacement points formerly used, it was apparent that we were moving in the right direction.

### Service & Savings

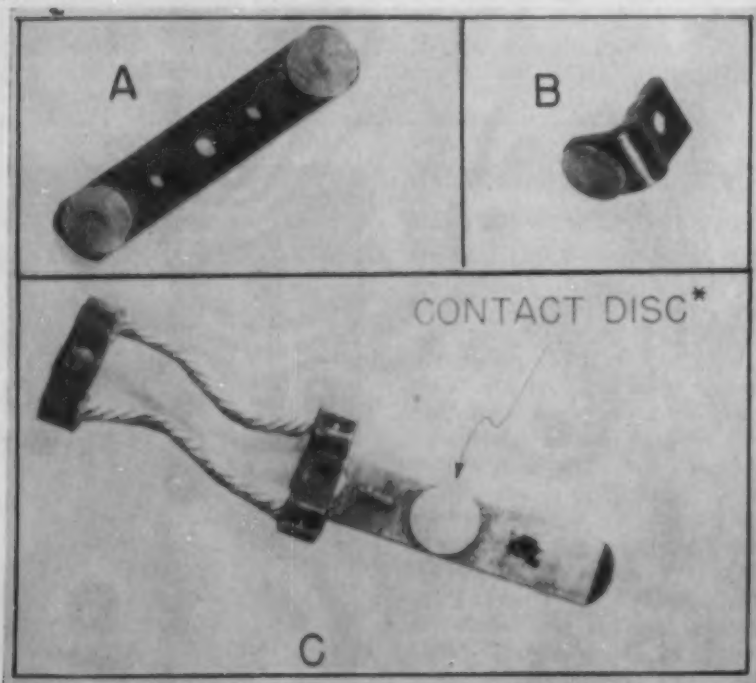
We are now using tungsten silver alloy contact discs as a standard replacement for all our electric truck points. This operation has resulted in a 65% saving. The most important factor is the 100% increase in service life we are now obtaining from these contact points. Although this is a good figure, we feel an even greater service life can be obtained with improved installation and alignment methods.

### How it is done—


The old contact discs are melted free from the copper bar by means of an oxy-acetylene torch. The new disc (purchased silver solder flushed on backside) is placed in position on the copper bar. Heat is then applied to the backside of the bar until the solder flows and a bond is formed. Extreme care should be used to avoid overheating the contact disc, as too much heat will be detrimental to this alloy.

For processing this type unit in large numbers, we use a 100 kva spot welder equipped with a carbon electrode designed to fit the backside of the copper bar for resistance brazing. Through the use of this process, the contact disc can be installed at the rate of ten per min. Although this is much faster than the acetylene method, the results are identical in service life.

\* Contact discs are purchased solder flushed on backside with silver solder. A complete set of contact points consists of two A's, five B's, and Five C's. Average service life of a set of these replacement points, in a 24 hour operation, was from one to three weeks. Use of tungsten silver alloy discs increased service life 100%.



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Nearly 12 billion pounds of steam have been generated inside this boiler and its twin. Boilers have never been acid cleaned. Tubes have never been turbined. All water side surfaces are clean-to-metal.

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FOR MORE FACTS ON  
HOW IT WAS DONE

<sup>\*</sup>We at ~~Water~~ think at least 99%!



## BOILER OPERATING DATA

● Two new boilers were put on line in a South-western municipal utility plant at the same time late in 1949. Rated capacity of each unit is 250,000 pounds of steam per hour at 950 p.s.i. Normal operating rates range from 150,000 to 175,000 pounds of steam per hour per unit.

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\* Registered Trademark



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What appear to be chalk marks in this unretouched photo are scrape marks which indicate only the usual powdery film left on the metal when the boiler is drained.



**AND THE MUD DRUM IS SPOTLESS, TOO!**

Another unretouched photo inside the mud drum of one of the boilers shows the like-new condition after years of service. No deposits or corrosion of any kind have been found in tubes or drums.

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## Where Does the Time Go?

*A single work-order form gives the answer in Georgia transformer plant.*

**By A. F. SCHLOTTERER**

Electrical Engineer  
General Electric Company, Power Transformer Plant  
Rome, Georgia

**I**S ACCOUNTING for time spent on miscellaneous maintenance jobs one of your problems? It was a big problem for the maintenance section of General Electric Company's Georgia transformer plant before the introduction of a single work-order form.

Too often, plant maintenance supervisors were hard put to explain unaccounted-for charges against the labor budget. Until recently there had been no good way to record time spent on emergency jobs and small jobs that involved minor alterations. This becomes a serious problem when future maintenance budgets are being set up.

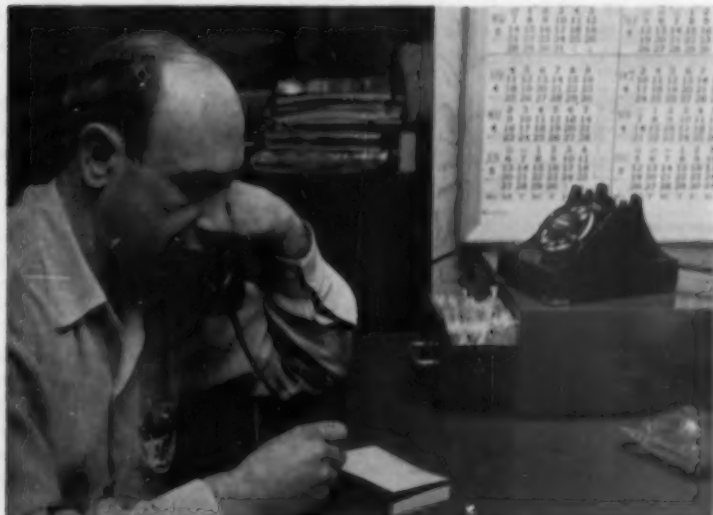
### How Form Is Used

The new order form, made in triplicate and numbered consecutively, takes care of this problem

as simply as possible.

The maintenance foreman keeps a pad of these forms handy and as he receives calls for these miscellaneous jobs he jots them down in the "Description of Work" blank. He then fills in the name of the person calling along with his charge number. If the work is part of a previously requested order for installation, repairs or improvements that request number is also recorded.

The foreman then enters the date and the name of the maintenance man who will be assigned to the job and puts the first two copies in that man's work-order box. The third copy goes in the foreman's desk file. Job priority is automatically set up by the form numbers, although naturally extreme emergencies will be taken care of immediately.



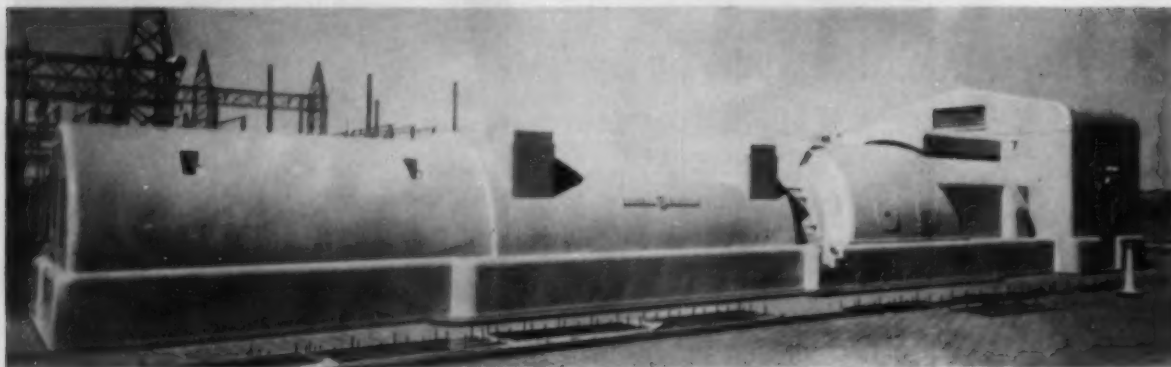
At the start of the working day, each maintenance man picks up his work orders and begins to clean up the back log. As each job is finished, the maintenance man completes his two copies of the work order by filling in the class of work, number of manhours expended, the completed date and the brass tag or inventory number of the machine on which the work was performed. At the end of the day, the completed original copy is returned to the foreman and the maintenance man retains the second copy to help him in filling out his weekly time sheet.

Naturally, because of lack of material or special parts that must be ordered or fabricated, some jobs cannot be completed in a single working day. In these cases, the third copy retained in the foreman's desk file serves as a "tickler file" and lets him check progress of the jobs. This file also serves as a guide to the foreman as he makes his rounds to check on the progress his men are making.

In addition to providing a good argument for next year's maintenance budget, the use of this form provides a surprising answer to the question, "Where Does the Time Go?"

H. F. Haskell, Foreman, Electrical Maintenance, demonstrates use of telephone order pad used by the maintenance group at General Electric's Medium Transformer Plant, Rome, Georgia.

In addition to answering the question, "Where Does the Time Go?" form provides a good argument for next year's maintenance budget.



Hydrogen cooled, 60,000-kw turbine generator at the Arbuckle Station.

## COMPLETELY OUTDOOR TURBO-GENERATOR UNIT OVERHAULED IN APPROXIMATELY THREE WEEKS

By **T. H. GEORGE**

Mechanical Engineer, Generation  
Department, Oklahoma Gas and  
Electric Company

and **L. E. CAHILL**

Chief Engineer, Arbuckle Station  
Oklahoma Gas and Electric Company

**T**HE Arbuckle Station of Oklahoma Gas and Electric Company was put in operation on March 18, 1953. It has one General Electric 60-66 MW nameplate machine with a sustained capability of 81.5 MW.

Since this is our first completely outdoor unit, considerable interest was manifest in its first major overhaul scheduled for April, 1954. This interest was heightened by the fact that, in normal times, rain is expected in that period.

### Advance Planning

Several weeks prior to the overhaul a tentative schedule was made up which listed items to be done, along with the names of the men who would do the work. Included, of course, were the things to be done prior to the overhaul as well as during the overhaul.

At a conference of all supervisors and lead men, this schedule

was reviewed point by point and a number of additions and changes were made. This final schedule enabled all concerned to plan their jobs well in advance, with the results that hoists, lathes, and other special tools were used to a high degree of efficiency.

### Maintenance Crew

The station complement of men is 33, of which 15 are operators and 7 are management and clerical. To supplement the resulting small maintenance group, 4 mechanics were brought in from other plants; and all operators, above the two per shift left on duty, joined the maintenance crew for the duration of the overhaul.

### Fast Program

Since this is the most economical unit on the system, it was to our advantage to complete the overhaul in a minimum of time. For safety reasons, however, it was decided to limit the scheduled work week to 6 days, 9 hours per day. Time allowed for the outage was 4 weeks; however, the general consensus of the veteran maintenance men was that "with good weather we'll give 'em back a week." In an effort to do this, the last work week was 7 days, 10 hours per day.

While the expected rains came, causing an estimated loss of three working days, good planning paid off; and with excellent coordination and cooperation, the unit was back on the line in 3¼ weeks.

### Extra Jobs

We are somewhat proud of this achievement because in addition to the usual maintenance items, there were large numbers of modifications and changes made to correct operational difficulties inherent in a new station. For example, when checking coupling for alignment, the generator half was found 6½ mils high. This necessitated removing shims from under all the generator feet.

Another fairly large job was cutting out an 8 inch welded end valve on a feedwater heater and replacing it with a new valve. Honing the hydraulic cylinder which was scored (presumably by sand during initial start up trouble) was a job not to be ex-

**EDITOR'S NOTE**—Leo E. Cahill has been Chief Engineer at Oklahoma Gas and Electric Company's Arbuckle Station for the past two and one half years. He will soon become Chief of the Riverbank power plant near Muskogee, Oklahoma, where OG&E is constructing a 170,000 kw addition.



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pected on an ordinary overhaul. Also, it was found necessary to realign and redowel the turning gear mechanism.

In addition to the rain mentioned above, another time consuming job on an outdoor overhaul is the removing and replacing each day of the roof of the turbine overhaul house. This is a wooden house, fabricated in sections, that is placed over the turbine during overhaul periods. It is the same one that was used during erection of the unit.

#### Other Points

Other points that may be of interest are:

1. **Control Valves**—An extremely hard deposit on the stems and bushings had materially reduced the clearance. Stems were placed in a lathe and the deposit was removed with fine emery cloth and kerosene. Bushings were cleaned the same way except that the emery cloth was wrapped around a length of air hose driven by a small motor.
2. **Wheels and Blading**—Rotor was put in rented railroad car and sandblasted. Also, most of the diaphragm nozzles were sandblasted. The 17th wheel had been nicked by some foreign object, and the nicks were polished out.
3. **Oil System**—A fire explosion door was added to the turbine oil reservoir.
4. **Cooling Tower**—To prevent corrosion, all conduit on the cooling tower was cleaned and taped with Polyken No. 910 coating, and all piping was given two coats of Insulmastic. This job was not done by plant forces. In addition, the cooling tower manufacturer treated the wood fill with a preservative.
5. **Boiler**—Plant forces did the normal maintenance and inspection; and the manufacturer put insulating material on an additional 9 feet of water walls in the furnace. The latter was done to improve superheat.

#### Balancing

When the unit came back on the line, the front end had consider-

ably more vibration than was desirable. Consequently, the machine was balanced by a factory representative. This necessitated 7 shut-downs with a total elapsed time of 12 hours.

#### Dependence on Weather

Summing up, we should say that overhauling an outdoor unit is

### Preventive Maintenance at Arsenal Hill—La.

(Starts on page 62)

them as they are under a baffle.

In repairing these tubes it was decided that as long as there were only a few tubes leaking, it would be best to cut off the tubes at the header and plug them. (See Fig. 4.) When a sufficient number have failed and thus reduced the temperature and increased the pressure drop appreciably, the baffle will be removed and all of the elements repaired at once.

Six convection superheater tubes out of 60 were removed from one boiler. This, however, did not affect the steam to the turbines, as all of the steam from the eight boilers goes into a common header and thus the small amount of temperature difference is readily dissipated in the steam from the other boilers.

#### Radiant Elements

Radiant superheater failures have been more prevalent, as these tubes are exposed to the furnace temperature. When the tubes first fail, they are welded; but after a certain length of time it is not practical to reweld them. At this time the entire radiant superheater is taken out and the part of the tube that is exposed to furnace heat is cut off and a new section welded on.

This method has been used to some extent for many years. Recently it was decided to use a special alloy steel for the section that is exposed to the flame. This alloy steel (2% Chrome and  $\frac{1}{2}$ % Moly) will withstand flame impingement, and it is hoped that the

very similar to overhauling an indoor unit, provided the weatherman is good to you. In many operations, however, the schedule is at the mercy of the weather, and prolonged inclement weather can be disastrous not only to the schedule of that particular overhaul, but also to the maintenance schedule of the entire system.

extra money spent for this type tube will pay for itself by longer life and still will have reduced the frequency of necessary repairs.

After the radiant superheater tubes have been repaired, a hydrostatic test is put on the tubes (see Fig. 2) before they are replaced in the boiler. Fig. 3 shows a section of the radiant superheater tubes after being installed in one of the older boilers.

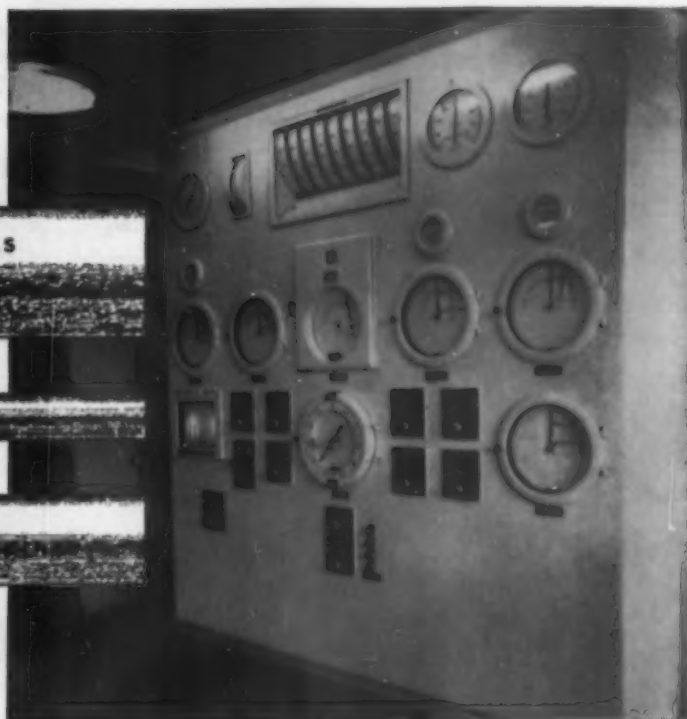
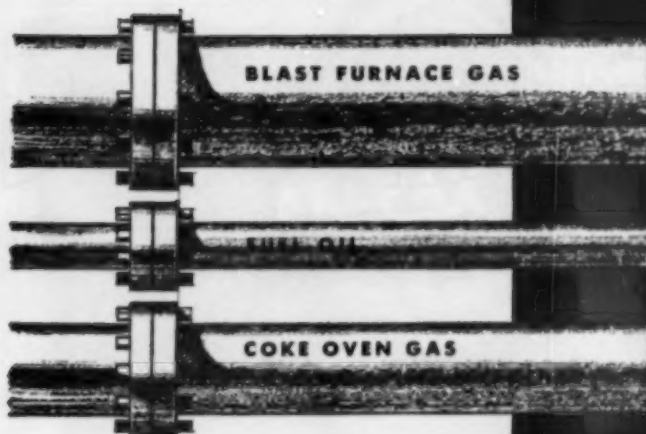
The radiant superheaters are connected to the headers by means of a ball and socket joint which has developed leaks in the past. The present established practice is to dismantle and clean the ball and socket and install a monel metal asbestos filled gasket in this joint. This has proved to be very satisfactory.

#### Service Record

The Arsenal Hill Power Plant was the main steam-electric power plant for the Southwestern Gas and Electric Company system from 1926 to 1952, at which time the gas cost increased to such an extent that it was put on a peaking basis. The plant reached its peak during World War II when it was run for 33 consecutive months with a capacity factor of 109%.

After the number of years the plant has been in operation and the adverse conditions under which it operated during the war, the plant is still in excellent condition and can produce its full capability on very short notice. This is credited to preventive maintenance and excellent workmanship by the mechanics. Recognition should also be given the plant operators in whose hands rests the proper operation of the plant equipment.





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### Automatically Selects Lowest Cost Combination of Three Available Fuels

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In addition to maintaining the proper fuel-air ratio and holding steam pressure constant at all loads, a Republic Control System automatically makes fuel selections according to the amount of by-product blast furnace gas available. At times when this low cost gas is plentiful, it is used as the primary fuel. The other two fuels are used only for make-up when available blast furnace gas cannot meet all of the fuel demand. If the blast furnace gas pressure falls below a predetermined minimum, however, flow

Boiler panel at steel mill power plant includes sub-panels and instruments for multi-fuel firing system. The boiler draft and fuel selection may be controlled manually from this panel, if desired.

is automatically reduced and one of the other two fuels also burned.

This dual purpose Combustion Control System cuts fuel costs two ways:

- (1) Because of efficient combustion, less fuel is used for a given steam output.
- (2) As much lowest cost fuel is used as possible.

Control Systems such as this one further illustrate how Republic engineers can design combustion controls that make the most of fuels available. Very likely, Republic can show you ways to get more power at less cost—automatically.

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COMBUSTION CONTROLS**

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- ★ For all types of firing
- ★ For all arrangements of draft      ★ For all load conditions

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original cost which has been expended in total cost of maintenance for one year is determined. The figure then is entered in the appropriate one of the last four columns, which are headed: 5% or Less, 10% or Less, 15% or Less, and Over 15%.

We double-check any machine whose maintenance cost falls in a high percentage column. Sometimes this high percentage indicates a mechanical condition that needs improving. Other times, though, it is caused by a low original cost, or by abuse from a particular operator.

A more thorough means of pick-

ing out machines whose maintenance is out-of-line is to establish averages. We determine an average number of work orders and an average cost of maintenance per machine for each family of machines. These averages are written in red pencil at the top of the appropriate column. Individual machines which score above family group averages are further investigated.

Our cost-of-maintenance analysis isn't so comprehensive that we can accept it as a final standard in comparing the efficiency of any two machines. We still must investigate the machines in order

to consider such factors as machine speeds and tolerances required.

But our system already has proved to be a major short-cut in reaching the cause of trouble. If it won't always put the finger on a guilty machine, the system at least will narrow your search down to a few good suspects.

It is relatively easy to compile, and it is compact. Maintenance cost records for every machine in a good-sized plant can be maintained in one loose-leaf notebook.

We expect the system to be a big help in keeping maintenance cost under control.

## Silicone Insulation Increases Motor Capacity in Texas Plant

MUCH of the sea water pumped into The Dow Chemical Company's famous "magnesium from the sea" plant in Freeport, Texas, is handled by six 71,000 gpm centrifugal pumps. Each pump is direct-driven by a 300 hp, 277 rpm motor. The entire line of motors is mounted on a massive underwater concrete foundation.

**Problem**—Recently Dow's plant expansion program reached the point where a pumping capacity of 90,000 gpm per unit was required. That capacity could be reached by 450 hp motors operating at a higher speed. But conventional motors rated at 450 hp would be almost half again as large, and much heavier than the existing units.

Larger motors would require extensive changes in mounts, brackets and other fittings, as well as re-

inforcement of the underwater foundations. Estimates of the cost of reinforcing the foundations alone ran as high as a half-million dollars. And that's not counting the cost of the new motors or the fact that the work would have to be done all at once, shutting off the intake canal and all but halting plant production.

**Solution**—Dow engineers solved the whole problem at a minimum cost and delay by having the motors rewound, one at a time, with silicone (Class H) insulation to develop 450 hp at 327 rpm. Capacity of each pump was increased from 71,000 to 90,000 gpm without any further modification of the installation.

An extra advantage of Class H insulation was demonstrated when one of the motors was removed to correct a shaft rub at the upper seal. This same motor had also developed a small leak in its upper housing. When the motor was disassembled, the bottom ends of the coils were found to be immersed in 25 gallons of rain water. And still the silicone insulated coils remained in good operating condition.





## **Simple Test Proves New Idea**



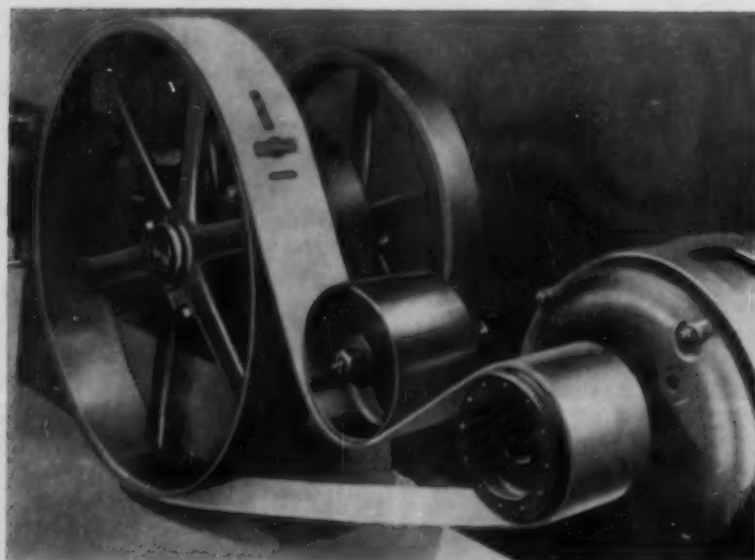
The match test dramatizes an idea—same match and same heat can burn the hand or simply warm it. Just as your welding torch or arc welder can, in combination with Eutectic "Low Temperature Welding Alloys," join metals without risk of dangerous overheating, distortion, warping and embrittlement. Write for free booklet "How To Overcome Your Welding Problems," (TIS 2268) Eutectic Welding Alloys Corporation, 40-40 172nd Street, Flushing 58, N. Y.

# BELT REPLACEMENTS

## Strive For Better Product, Better Installation

By J. A. MULLER

Executive Engineer  
Thermoid Company



**T**HE chief advantage of flat belts is their low cost compared to other driving methods. Because they can be and generally are furnished for splicing with metal fasteners on the job, they can be used where the shafts are fixed and endless V-belts cannot be used. Flat belts often offer advantages over other methods when the driven pulley is separated by a long distance from the driver.

Because replacement and installation of flat belts continues to represent a sizable amount of business, belt manufacturers are constantly making improvements in belt design. Rayon fabric instead of cotton duck, for instance, permits thinner belts. Thinner belts mean less heat build-up in flexing around the pulleys and, therefore, longer life. A slight weight reduction is also obtained from using thinner belts.

Although a transmission belt is almost all fabric, there is some

rubber. Better rubber compounds available today add to the belt life by improving adhesion, reducing the effects of oxidation, resisting wear and abrasion.

### Belt Splicing

Belt splicing plays an important part in belt life. Metal fasteners are most widely used. The correct size and type for the particular service should be selected. Installed correctly and well maintained, they will give good service. Belts joined with metal fasteners can be shortened easily.

Flat belts are also furnished for heavy duty in endless form with vulcanized splices made at factory.

### Applications

For peripheral speeds of 6000 fps in applications in which speeds are constant with infrequent starting and stopping, flat belts provide an inexpensive means of transmitting power, especially when the

distance from the driver pulley to the driven is great.

Many ingenious flat belt drives have been designed by individual engineers for specific applications. Although most flat belt drives involve parallel shafts, it is practicable to contrive drives in which one shaft is placed at almost any angle with respect to the other.

### Tips on Installation

Here are a few tips on installing angular flat belt drives:

- (1) Belt must be delivered in the plane of the pulley toward which it is running.
- (2) Use pulleys as large in diameter as practical.
- (3) Keep center distances between pulleys as long as practical.
- (4) Sufficient space must always be provided between pulleys of an angular drive to permit the belt to turn or change its plane.
- (5) Be sure that the belting is the proper kind, width and thickness for the drive. While the use of good belting is recommended for any drive, it is particularly necessary for angular drives.
- (6) Arrange guide pulleys to assure a minimum flexing of the belt.
- (7) Make sure "mule" pulleys are heavily crowned, in order to properly hold the belt.
- (8) Do not use flanges or guide plates unless absolutely necessary.
- (9) Special belts for quarter turn drives are usually made up by:
  - (a) a half turn of the belt;
  - (b) making one edge of the belt longer than the other.
- (10) By proper design, most angular drives can be made reversible.

Heat-treating and physical testing equipment shown at left is used for quality control of welding operators and for development of new welding procedures.



▲ This Rockwell hardness testing machine measures the hardness of weld specimens as a guide to proper procedures for heat-treating of welds.



▲ A laboratory technician cuts a sample from a pipe weld prior to grinding and polishing for metallographic examination.



▲ Here a weld specimen is etched to outline the grain structure for further metallographic study.

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is your insurance of  
quality welds in**

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## Ventilated Dry Type and Liquid Filled Transformers Discussed

# MAINTENANCE OF POWER TRANSFORMERS

By P. BELSKY\*

Westinghouse Electric Corporation

### VENTILATED DRY TYPE

**A** MAINTENANCE schedule for dry type transformers like other electrical apparatus depends upon existing operating conditions. For dry clean areas, inspection once a year may be sufficient. Contaminated atmospheres may necessitate maintenance every few months. After the first few inspections a definite schedule can be determined to suit individual installations.

With the transformer de-energized and side panels removed, inspect for dirt on the insulating surfaces and in air ducts. Connections should be checked for tightness and look for signs of overheating or voltage creepage over insulating surfaces shown by tracking or carbonization.

Dirt may be removed from the windings with a vacuum cleaner, a blower, compressed air or even nitrogen. Compressed air or nitrogen should be clean and dry, and applied at a pressure not to exceed 25 psi. The use of the vacuum cleaner is preferred for large areas. Dirt may be blown from inaccessible parts with a blower or compressed air but the dirt will scatter and settle on other parts from which it must be removed.

Insulation tests should be made before placing a transformer in service to be sure it is in satisfactory operating condition and to obtain data for future records. Variable factors of temperature and humidity make it difficult to set insulation resistance limits. However, an approximate value of 2 megohms per 1000 volt of nameplate voltage rating is satisfactory but in no case less than 2 megohms

total. (1 minute reading at approximately 25 C).

Occasionally a high potential test is made when major revamp or repair is performed on the transformer to verify satisfactory operation. These test values are as follows for a one minute interval:

Insulation Class	Test Voltage
1.2 KV	3 KV
5.0 KV	9 KV
8.66 KV	14 KV
15.0 KV	23 KV

If desired additional tests can be performed to check ratio and polarity and to determine winding resistance. This information can be useful as a guide in checking a transformer over a period of years or following repair work.

If the transformer has been subjected to unusually damp conditions, it should be dried out before placing in service. Humidity conditions are not important as long as the transformer is energized. If a shutdown period occurs during condition of high humidity, which can cause condensation within the transformer housing, then strip heaters should be placed in the bottom of the unit after shutdown to maintain a temperature inside the transformer case several degrees above outside ambient.

When it is necessary to dry out an air cooled transformer, there are three standard methods which may be used: 1) external heat; 2) internal heat; 3) external and internal heat. The third method is by far the quickest. It is recommended that the winding temperature not be permitted to exceed

100 C as measured by resistance or by thermometers placed in the ducts between the windings.

Measure insulation resistance to determine the status of drying. Measurements should be taken at 2 hour intervals. Because insulation resistance varies inversely with temperature, the transformer temperature should be kept approximately constant during the drying period to obtain proper readings.

As the transformer is heated a rapid drop in resistance measurement will probably occur due to presence of moisture, followed again by a gradual increase until near the end of the drying period it will increase quite rapidly.

A curve should be plotted of the time and resistance until the resistance remains constant for about 3 or 4 hours. The insulation resistance measurement should be taken for each winding to ground with all windings grounded except the one being tested. Be sure to ground and short circuit any winding to be measured to drain off possible static charge.

Air cooled transformers are often applied in combination with primary air switches with or without power fuses. Such switches can be obtained either for magnetizing or load break operation and should be inspected and cleaned at regular intervals. Interrupter parts should be checked for tightness and erosion. This type of switch has a limited life under full load interruption and may at times require replacement of arc interrupting details if subjected to unusual switching service.

### LIQUID FILLED TRANSFORMERS

**I**N GENERAL liquid filled transformers, whether oil or Askeral type, will require inspection to determine whether there are any conditions indicating the entrance of moisture either prior to energizing

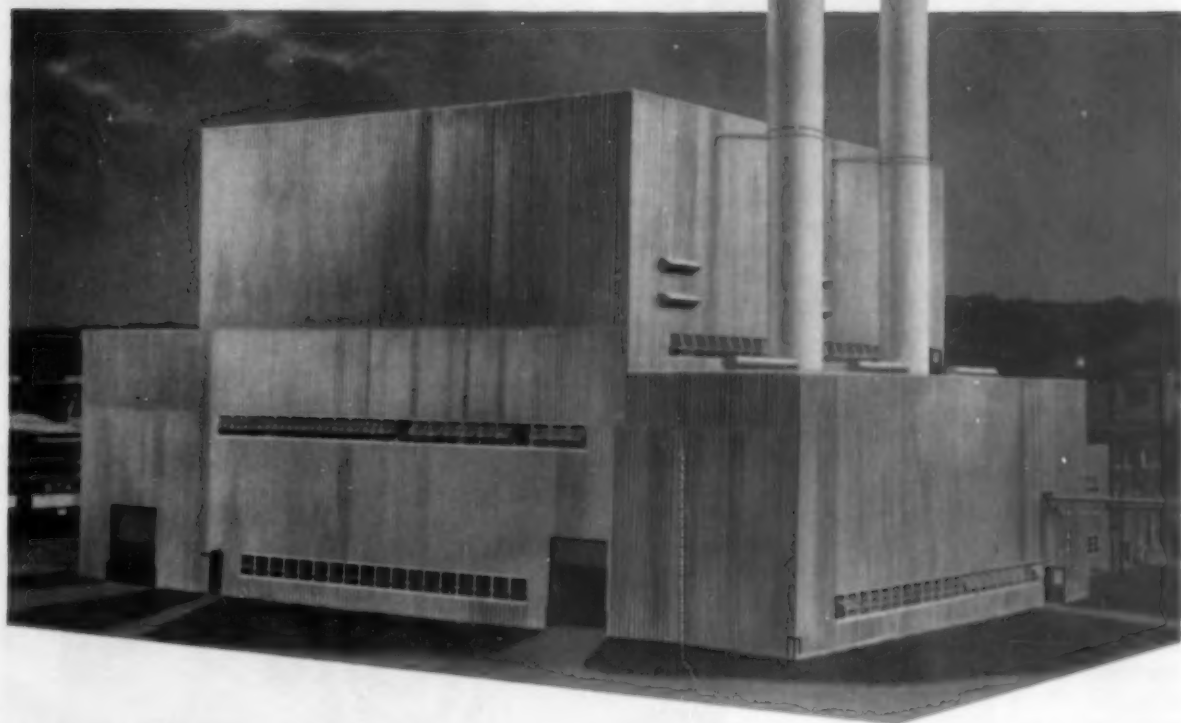
or while in service.

Samples of the insulating liquid taken from the transformer case should have a dielectric strength of 26 kv although this value can vary somewhat without danger to the

\* Abstracted from "Maintenance of Distribution System Equipment," presented at the Western Plant Maintenance Conference in Los Angeles.



*In addition to the boiler plant, Stone & Webster Engineering Corporation designed and constructed a Chemi-Groundwood Pulp Mill and constructed the new woodyard, new wood and grinder facilities, alterations to the screening process, and all facilities for two new paper-making machines.*



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### STONE & WEBSTER ENGINEERING CORPORATION

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SOUTHERN POWER & INDUSTRY for MAY, 1955

equipment. If the liquid shows a dielectric strength of less than 22 kv it should be reconditioned.

Oil samples should be procured from the bottom of the tank while Askeral samples should be taken from the top because of the difference in specific gravity.

Caution must be used in handling Askeral. It is a skin irritant. Unnecessary contact should be avoided, particularly when it is hot.

Oil will mix readily with Askeral and it is almost impossible to separate them. Avoid such contamination since it changes the non-inflammable characteristics of Askeral. Likewise a filter press used for Askeral reconditioning should not be used to handle oil or other materials because of the possibility of contamination.

The method of testing either oil or Askeral liquid has been standardized by the American Society for Testing Materials. This is a subject on which much time and effort has been spent. Suffice to say that complete details on the testing equipment and instructions for its use are available on request from the suppliers of liquid filled transformers.

Since the successful operation of liquid filled transformers depends upon the condition of the insulating liquid, the utmost care must be exercised in keeping the liquid clean not only when filling the transformer tanks but whenever the tanks might be opened for inspection.

Containers of insulating liquid must be allowed to reach room temperature to prevent condensation of moisture which may mix with the liquid when pouring.

Never use Askeral liquid in a transformer designed for oil insulation since Askeral acts as a solvent on most varnishes and paints used in an oil transformer.

Modern liquid filled power transformers are so designed that there is little possibility of the transformer breathing during its normal load cycle and therefore the insulating liquid should not be exposed to moisture or oxygen in the air. A thorough inspection, therefore, which would entail opening the tank for inspection of internal parts will be necessary only infrequently, if at all, unless there are

specific indications of trouble. Normal maintenance procedures for cleaning cooling surfaces and mechanical parts together with periodic insulating liquid dielectric tests for average loads and service should be adequate.

Many applications for liquid filled transformers in distribution systems involve the use of primary switches mounted adjacent to the transformer as isolating disconnects or combined with power fuses in load break or magnetizing break switching.

Generally speaking, liquid filled switches are used with liquid filled transformers and are interlocked to break magnetizing currents only. The insulating liquid in the switch requires the same periodic dielectric test procedure recommended for the transformer itself

and the same precautions must be observed.

The mechanical parts of the liquid filled switch itself should require little attention in normal operation since it will be used infrequently to break magnetizing currents only. Air insulated switches with or without power fuses will require inspection and maintenance as described in previous paragraphs.

Many of the tests and procedures outlined require special apparatus which can be purchased or fabricated to suit the requirements of every installation. However, most manufacturers of switchgear and transformer equipment maintain local facilities and personnel which together with test apparatus are available for use under the supervision of competent electrical service engineers.

## "Maintenance Free" Lighting in Alabama Plant

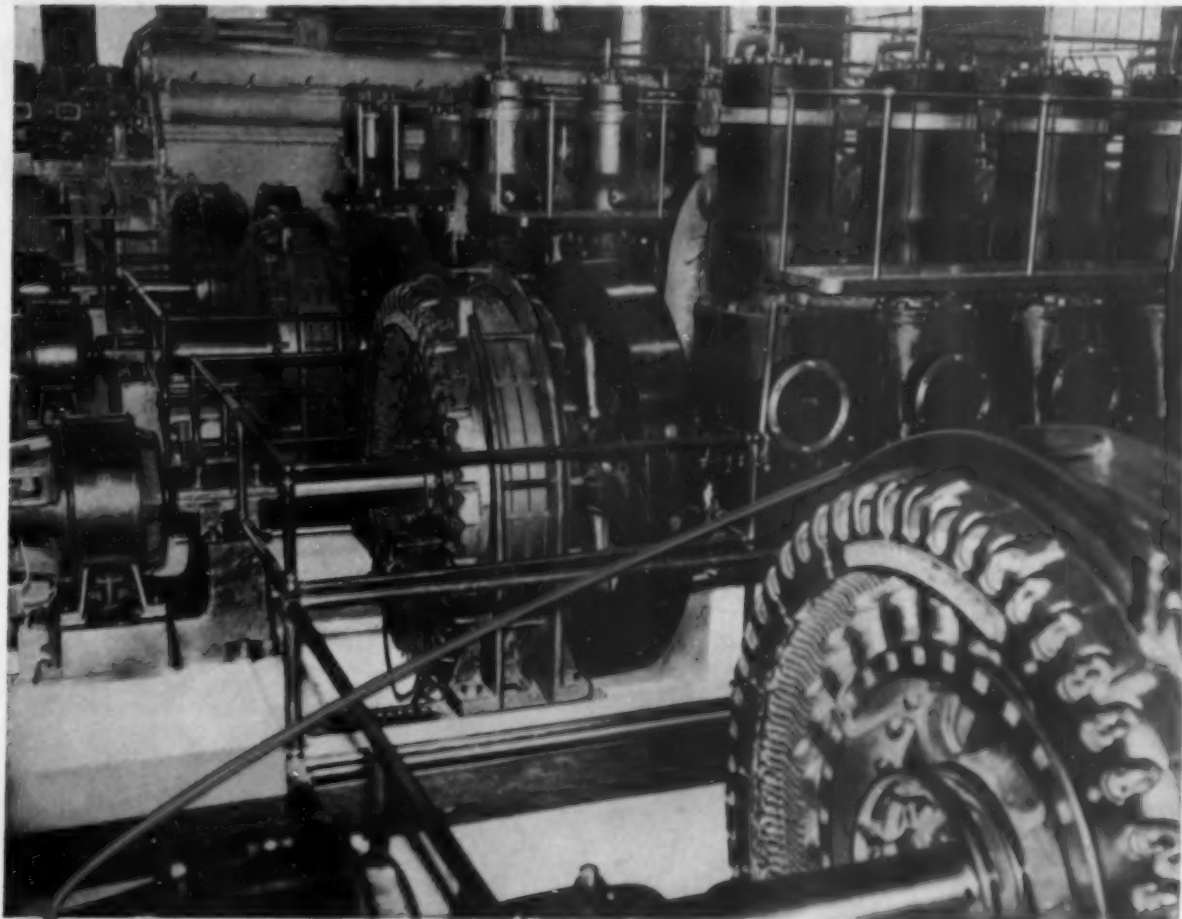
**T**O ACHIEVE excellent illumination for storing and shipping, the Stylon Southern Corporation of Florence, Alabama, installed in their warehouse five Wascolite Skydomes, the prefabricated toplighting units that admit daylight through shatter-resistant acrylic plastic domes set in leakproof metal frames.



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See your Sinclair Representative today for further information or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

## SINCLAIR

## GASCON OILS

## Defective Plant Wall Modernized

By **SAM BOYER**

Wisteria Hosiery Mills, Inc.  
Gastonia, North Carolina

**M**ANY hosiery mill executives, who have visited our plant, have commented on the smooth flow of goods from the knitting department on to the final shipping operation. The modernizing program, completed in 1947, provided a new building several times the size of the original plant. And it was complete with air conditioning, continuous row lighting, suspended ceilings, some glazed tile walls, and others painted beautiful pastel shades. In fact, it was, and still is, a beautiful and efficient plant for hosiery knitting, dyeing, and finishing operations.

However, there was one flaw in the building construction which eventually proved a serious problem. The "temporary" north wall was in a badly deteriorated condition by 1954. All other walls about the plant, including the spacious steam plant, are constructed of red brick and will last indefinitely without needing maintenance of any type.

An exploratory examination of the deteriorated wall and footings had begun when the accompanying photograph was made. This explains the pile of dirt in front of the wall. The excavation was later enlarged for the reception of new footings for the brick veneer wall which was erected later, and which is illustrated in the second photograph.

Hosiery was wholesaling at \$11.50 to \$14.50 per dozen in 1947, instead of the \$5.50 to \$8.00 quoted now. Therefore most hosiery manufacturers at that period had visions of acres of post-war knitting. With this dream in mind, manufacturers planned their build-



**RECONDITIONING** was completed in exactly one week without interruption of plant work schedules.

ing programs to allow rapid expansion.

Our plant was no exception to this dream of future greatness, so our predecessors built the north wall of so-called temporary construction to permit rapid alteration in case of sudden expansion. This was done although the new knitting room was large enough to accommodate all incoming new machines for many years in the future.

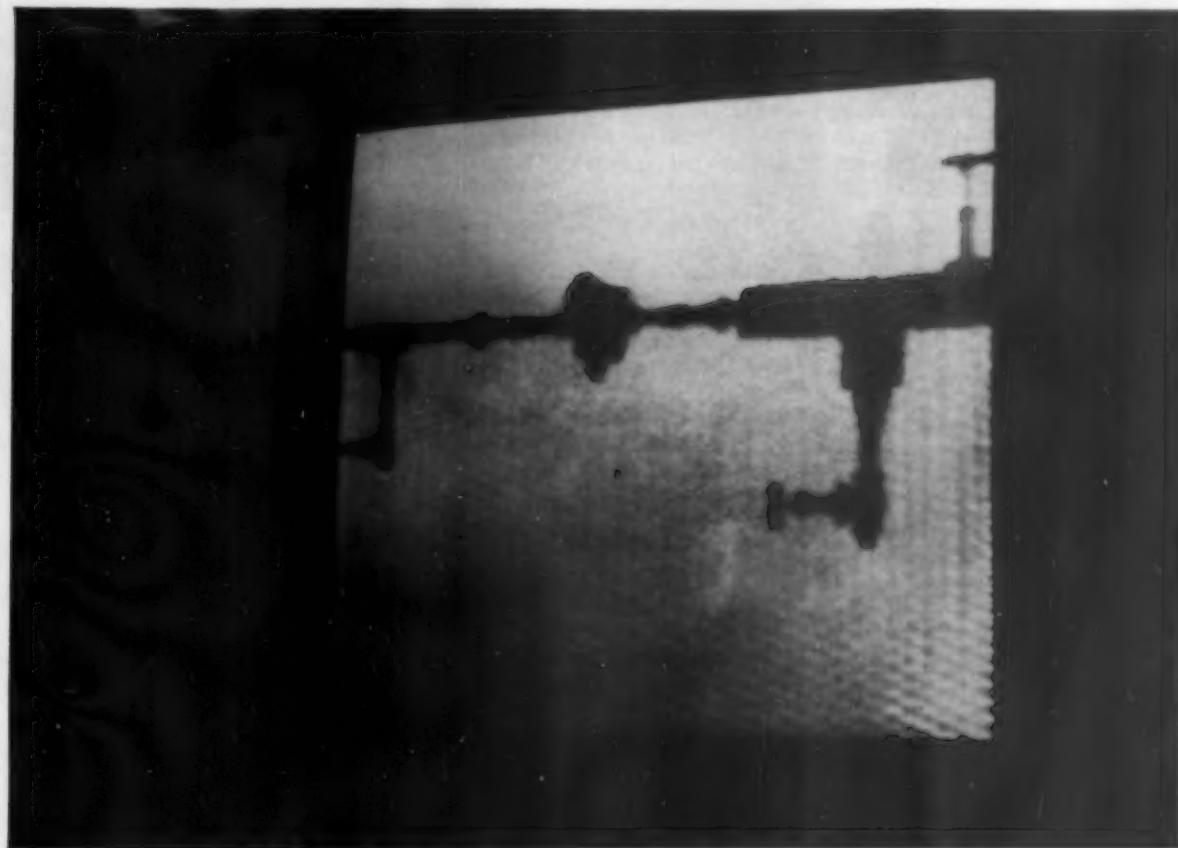
Temporary construction often becomes permanent construction, and so it was with our north wall.

A year or so after its erection, it began yielding to the elements of deterioration, and we inherited a growing problem when we assumed control of the plant. Finally, as the photograph shows, the paint on the wooden structure was in blisters, the siding was warped and cracked and pulled loose from the storm sheeting. Excessive moisture had penetrated the vapor shield and caused the impending destruction.

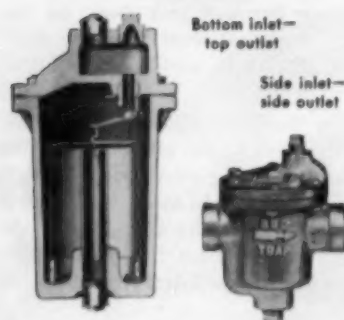
### Wall Composition

Before getting bids on replacing





## A Steam Trap Casts a Mighty Big Shadow



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**Faster Heat-up.** Oven at pharmaceutical plant heats up 40 minutes sooner.

**More Production.** 30% more output from cooking kettles at National Cranberry Co., South Hanson, Mass.

**Less Fuel.** Coal consumption reduced 400 tons annually at A. J. Tower Company, Boston, Mass.

**Less Maintenance.** 25% less trap maintenance at Hooker Electrochemical Company, Tacoma, Wash.

**BIG effects from little traps!** And, the effects are multiplied by the number of traps in your plant until they grow to be a major influence upon operating efficiency. Your nearby Armstrong Representative can help you get maximum output from steam heated equipment at minimum cost. Call him, or write:

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Armstrong traps also cataloged in Sweets and Chemical Engineering Catalog.



888

the wall, we analyzed its composition. The exterior was German siding, next was waterproof building paper over storm sheeting, which was firmly nailed to 2" x 6" studding. On the inside of the building was an expensive 4-ft wainscoting, with 4' x 8' sheets of smooth asbestos above and joining the suspended vermiculite ceiling. On the inside of the studs was a waterproof vapor shield, and the space between studs was filled with mineral wool insulation. Although of a temporary type of construction, it probably cost more than an 8-in. brick wall at the time of construction. The interior is beautifully finished panelling.

#### Reconditioning Procedure

Bids on removing the entire north wall and replacing it with 12-in. brick averaged approximately \$3.00 per sq ft, and replacing with a temporary 8-in. brick wall averaged approximately \$2.00 per sq ft. This did not include changing a few hundred feet of process piping and electrical conduit attached near the wall. But the main obstacle was that the plant would have to be idle approximately 10 days because of the interruption to the air conditioning system.

After careful consideration, we conceived the idea of constructing a brick veneer wall. Accordingly, we consulted a reputable contracting concern and were told that our plan was most practical. It also meant that the plant could operate during the construction, as the only changes necessary would be the removal of the outside weatherboarding or siding.

The job was completed in exactly one week without interrupting the work schedule of our plant. The second photograph shows the construction in progress: bricks being laid, siding being removed, and storm sheeting is being creosoted for protection against decay.

None of the roof flashing or counter-flashing was disturbed. A glazed tile coping was used to cover both the original flashing and the top of the new brick work. The pilasters are placed on 8-ft centers to make the veneer work more rigid and stable; they are 12 ft in height, which brings them even with the

height of the suspended ceiling inside the plant.

From the standpoint of cost, the entire alteration averaged approximately \$0.85 per sq ft, as compared to \$3.00 per sq ft for a 12-in. brick wall. We also have the advantages

## Repairs on Leaking High Pressure Gaskets

AT TIMES when it is most inconvenient to shut down 600 lb steam lines, leaks have occurred at the oval ring gasketed juncture of a valve and line. The high pressure steam cuts a groove in the flange face, making simple repairs impossible in most cases. Our Utilities Maintenance Group has developed the following emergency repair procedure for such cases.

The outer perimeter of both flanges on the valve and the pipe is cleaned, around hexon nuts and around pipe and flange where pipe flange seam weld will be made. A threaded coupling is welded to the lower part of the flanges or at a point where the leak has occurred; install nipple with valve in coupling. The hexon nuts are then seal welded to the flange, the arc is directed to the flange side of the nut. This normally requires one pass with a  $\frac{1}{8}$ " electrode with low amperage.

A mild steel wire or rod of such a diameter to set tight in the space between the flanges is secured in this space between the flanges so as not to protrude beyond the outer edges of the flanges. A  $\frac{1}{2}$ " space is left between the ends of this wire or rod directly in line with the opening in the coupling.

The wire or rod so secured is seal welded to each flange by running a smaller stringer bead on each side starting at a point of the greatest flange leakage and terminating seal weld by tying into coupling.

After seal welding, complete weld of outer perimeter of flange. Since flange is normally under a preheat temperature of approximately 350 F in the case of a 600 lb steam line, amperage requirements will be lower than usual.

of the insulation within the wall, whereas the proposed 12-in. brick wall located on the north side would have probably sweated in cold weather. We are well pleased with the practical solution to our building problem.



VALVE to pipe flange joint repaired by seal welding.

Maintaining as low amperage as practical (90 to 100 amperes with  $\frac{1}{8}$ " electrode; 100 to 115 amp with  $\frac{5}{32}$ " electrode) will aid in eliminating porosity and slag. As the last step, seal weld flange to pipe, taking care to avoid deep penetration of pipe.

In the event that the leak is of unusually large size, an air or steam hogging jet may be connected to the valve to assist in removing the gas from the space under the ring to eliminate the excess leakage that would interfere with welding.

After completion of the welding as described above, the valve installed in the coupling may be closed and leak eliminated until such a time as a shutdown of the line and permanent replacement of flange and valve accomplished.

Reported by J. D. HUHN, Area Foreman, and GENE STORER, Assistant Area Foreman, Maintenance Department, Carbide and Carbon Chemicals Company, Texas City, Texas



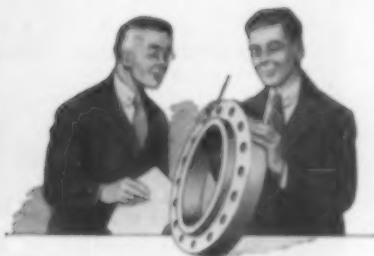
*The WeldELL® line — the first full line of seamless butt-welding fittings — gave the "go" signal to modern pipe welding.*

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## We had to quit guessing in the twenties

The founder of Taylor Forge used to say that "uniformity of strength should be the final goal of every engineer"... and no doubt this kind of thinking motivated the Taylor Forge organization to take so much initiative in the development of forged steel components for pressure piping.

The pattern was set in the twenties. Before 1920 little had been done in the way of pipe fitting and flange standardization. As early as 1905, however, Taylor Forge had produced forged steel flanges for Taylor pipe, and they had proved so superior to cast iron flanges that within a few years more flanges were being made for others than for our own use. But these forged flanges were bolted to the iron flanges of valves, pumps, and the like; so they simply followed cast iron standards.

In view of the obviously far greater strength of forged flanges, this was foolishly safe, and patently not at all in the "Uniformity of Strength" tradition. Moreover, in the twenties pressures were starting their upward climb. The 125 lb. and 150 lb. standard wouldn't do. Now it was 400; then 600; then 900 pounds. As the pioneer and leader in this field, Mr. Taylor saw the need for formulating standards and went to work on it.

Although one of the first studies conducted in this field, his work ranks to this day as one of the most thorough jobs ever done. In this work Mr. Taylor was in touch with Mr. Sabin Crocker, who is author of today's "Piping Handbook." He also collaborated with Professor E. O. Waters of Yale. Mr. Taylor ran exhaustive full scale tests on actual flanges to provide the test data which was then analyzed and formulated by Mr. Taylor and Professor Waters. The result was the Taylor-Waters Formula, presented before the ASME in 1927.

Still found in every engineering handbook, the Taylor-Waters formula was, and is, the basic means of determining flange stress under a given condition of loading. In the years since, Taylor Forge has also played a leading part in bringing standards into correlation with broadening needs... but this is *another* story.

**An episode in the story of  
Taylor Forge leadership in designed piping**



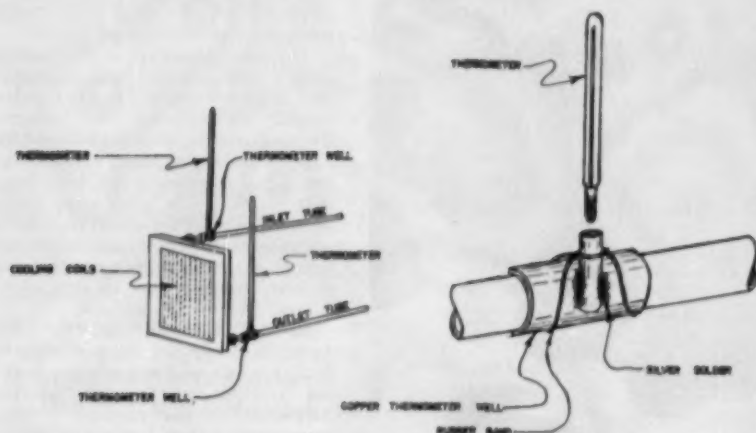
## Plant maintenance ideas and methods (continued)

### Advantages of Single Disc Cutter in Preparing Surfaces for Metallizing

**B**ENEFITS have been derived by changing from a multi-disc to a single disc cutter on the knurling tool used to prepare surfaces of cylindrical objects for metallizing.

Surface preparation consists of threading and roughing (turning)

the threaded area. Thread roughing is accomplished by contacting the surface of the rotating cylindrical object with the outer edge of the cutter disc. As the two surfaces rotate, the threads are indented and turned down by the disc teeth, thus forming the rough



### Thermometer Wells for Testing Refrigerating Unit

**I**N DETERMINING whether or not the expansion valve on a refrigerating unit is set correctly for optimum refrigerating effects, the inlet and outlet temperature of the cooling coils must be taken while the adjustments are being made.

In order to determine such temperatures, (inlet and outlet) close to the cooling coils, we made a set of two detachable thermometer wells of copper, as shown in the illustration.

In making the thermometer well, a piece of hard drawn copper tubing was selected such that its diameter was approximately equal to or slightly larger than the outside diameter of the refrigerant tubes entering and leaving the

cooling coils. A 2 in. length of this tube was split in half lengthwise with a hack-saw. A one inch length of  $\frac{1}{4}$  diameter copper tube, with the lower end crimped with a rotary tube cutter (so that the thermometer would not slide on through) was attached with silver solder to the outer side of the split half of the larger tube.

The thermometer wells were fastened to the refrigerant tubes to be temperature tested with rubber bands. Normally temperature testing does not last longer than 24 or 36 hours.

Such detachable thermometer wells are easy and inexpensive to make and can be used on any number of refrigerating units.

By GEORGE SIMON

base which is essential in acquiring a strong mechanical bond between the parent and sprayed metal.

The commercial multi-disc cutter consists of four  $\frac{1}{16}$ " thick,  $2\frac{1}{2}$ " OD hardened steel plates, with teeth on the outer edges, mounted on a common hub. This hub fits over the axle of the stationary element which is clamped to the machine. Thus, the cutter disc is free to rotate as it is contacted by the rotating cylindrical object.

During the roughing operation, considerable force is exerted  $90^\circ$  to the disc surfaces. This force varies on different plates as the threads are roughed, since at each instant the teeth that contact the ridges are stressed while those coinciding with the thread roots are free. Since the plates are thin and easily deflected, this operation soon causes the outer plates to break, rendering the cutter disc useless.

A single disc cutter  $\frac{1}{4}$ " thick with gear teeth on the outer edge is now being used. This single disc produces identical effect as the multi-disc and is more rigid. Considerably longer service life is being secured from the single disc cutters. In addition, new gear teeth can be cut on the single discs as they become worn.

By FRANK FIELDS, Machinist Dept., Baytown Refinery, Humble Oil & Refining Company, Baytown, Texas.

### Pump Shaft Repairs

**W**ORN and scored centrifugal pump shafts can be reclaimed, cheaper than the full cost of replacement, by properly equipped industrial machine shops. Here are a few methods.

1. If the sleeve is worn by the Teflon seal ring of a mechanical seal, the sleeve can be ground, chrome plated, and reground to standard size. If the shaft is solid, the same type of repair can be effected.

2. If the shaft is badly worn by packing or damaged in the fit of the impellor, the bad section may be cut off and a stub of similar material welded on. The stub should



# Fact:

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## Plant maintenance ideas and methods (continued)

be larger than the original shaft, and the ends to be welded should be chamfered. It's all right if the new stub is slightly out of line after welding. Run the bearing fit in a steady rest, put a center in the stub, and remachine the shaft to the original dimensions.

3. Worn ball bearing fits may be reclaimed in short order by under turning and metallizing with steel, stainless steel, or bronze.

4. Worn sleeve journals may be spray metallized with No. 2 Metcalloy (Hi chrome—Hi carbon) which has to be ground, and which provides a journal superior to the original material.

An interesting use of the stub method (No. 2) is the welding of a stainless steel, 20 class steel, or Hastalloy to a shaft of milder alloy. Thus any of the steels can be joined together, providing

proper welding techniques are used.

For superior wear resistance on reciprocating shafts, No. 2 Metcalloy is good when used with oil lubrication and metal packing. For very good wear in chevron packing service, three methods of shaft coatings may be used. Chrome plate, Colmonoy No. 6 or Haynes No. 40 (sprayed and heat bonded and ground), and welded half-sleeves of Haynes Stellite No. 1 or No. 6. Chrome is the hardest at Rockwell C Hardness of about 70-72, the Colmonoy type coating about 63-65 RCH, and Haynes Stellite No. 1 about 50 RCH. These coatings have high corrosion resistance as well as excellent wear resistance.

By E. C. PAULS, maintenance engineer, Carbide and Carbon Chemicals Company, Texas City, Texas.

## Silicone Paint on Louisiana Stacks

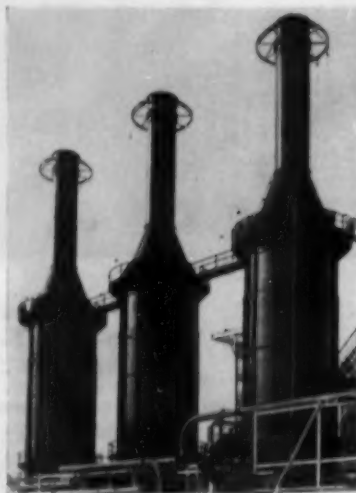
THE Cit-Con Oil Refinery near Lake Charles, Louisiana, is one of the newest and largest fully integrated lubricating oil and paraffin wax plants. A joint enterprise of Cities Service and Continental Oil, the plant is finished in sparkling aluminum and gleaming black. What's unusual is that the black is used to protect the surface of such large units as petrochem furnaces and exhaust stacks.

Soon after this modern refinery was completed, it became evident that even the most heat-resistant organic black finishes would not last from one annual unit shutdown to the next. The best of them developed rust stains in a few months.

Then in July 1952, when the steam boiler was down, the three 100 ft stacks in the unit were wire-brushed and a single coat of a silicone resin based black finish formulated by Allied Paint Company of Tulsa, Oklahoma, was applied. The coating was allowed to air dry and

cure in service. Later the petrochem heater stacks and all other stacks in the plant were refinished in the same manner.

Two years later, the black finish was as bright and glossy as ever, despite surface temperatures ranging from 350 to 700 F. Shutdown time has come and gone for most of the stacks with no refinishing required. The silicone paint has already paid for itself in reducing refinishing costs.



## Hints for Proper Insulation Maintenance

HEAT insulation is a valuable part of plant equipment, and its continuing function of saving fuel and aiding operations deserves thorough inspection and maintenance. This is one of the important subjects discussed in the newly revised 80-page Manual on 85% Magnesia Insulation, published in February by The Magnesia Insulation Manufacturers Association.

These are the steps which the manual states are followed in a well organized maintenance program:

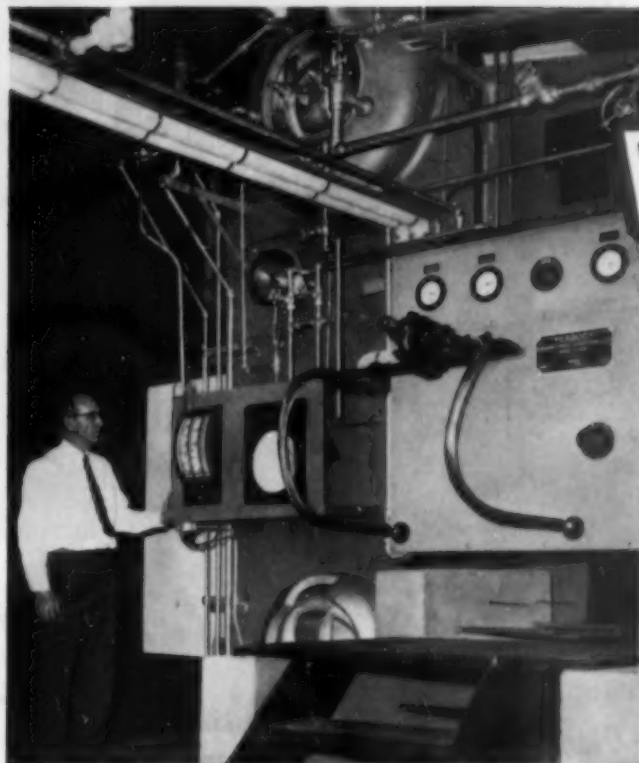
1. All equipment is inspected regularly to see that all sources of heat are insulated (for example, new sections of piping).
2. Insulation thickness is periodically evaluated. Changes in operations or costs of fuel may warrant an increase in insulation thickness.
3. Protective jacketing on insulation is regularly surveyed to check for signs of mechanical, chemical or other damage. There may be indications that a different type of jacket—one providing more protection—is required.
4. Scorched spots on jackets are thoroughly investigated since they may indicate a crack or structural damage in the insulation underneath.
5. Weather-resistant jackets are given periodic inspection for holes, torn and loose laps, loose or broken wiring, and deterioration of the jacket due to weathering or mechanical damage.
6. Weather-resistant plastic finish on outdoor fittings, vessels, and other equipment is inspected carefully to locate any mechanical damage or cracks which may permit water to seep into the insulation. It is desirable to paint this type of finish every five years or oftener, both to lengthen the life of the protective coating and to seal small, hairline cracks.
7. The insulation is examined for mechanical damage. The damaged insulation is cut out and replaced with the same material



# HOTEL SYRACUSE

SYRACUSE, NEW YORK

## CUTS STEAM COSTS by \$13,680 per year



Chief Engineer John Reschke of Hotel Syracuse makes routine inspection of new FW Packaged Steam Generator. This single unit, in continuous year-around service, supplies all steam requirements for the Hotel's 600 rooms, 4 restaurants, 3 kitchens, 13 stores, lobby, grand ballroom and laundry PLUS the heating and processing requirements of an adjacent hotel!



with this new  
**packaged  
steam  
generator**

Central New York's largest hostelry, the 600-room Hotel Syracuse, recently replaced two of their original coal-burning boilers with a Foster Wheeler 25,000 lb/hr Packaged Steam Generator.

According to Chief Engineer John Reschke, the advantages of the new unit were immediately apparent. Steam cost dropped from 90 cents to 71 cents per 1,000 lb. Based on average consumption of about 72,000,000 lb per year, this represents an annual saving of \$13,680 in steam costs alone. Other advantages are rapid steaming, lower maintenance and a cooler boiler room.

• • •

For low-cost steam "where you need it — when you need it," you get a better buy with the Foster Wheeler Package Steam Generator. For more detailed information, write for new catalog, PG-55-3. *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

### LOOK INTO THESE FW FEATURES:



**RAPID LOAD SWINGS.** Large diameter drums and ample heating surface.



**HIGH STEAM TEMPERATURES.** Provisions for high superheat.



**ADAPTABILITY.** Easily moved. Require only a slab foundation—permit outdoor installation.



**ECONOMIZERS.** Package economizers available to increase capacity and minimize fuel cost.



**ACCESSIBILITY.** For inspection, cleaning and maintenance.



**COOLER OPERATION.** Maximum water-cooled surface, special insulation mean cooler boiler room.

# FOSTER WHEELER

## Plant maintenance ideas and methods (continued)

and method of securement as used originally. The joints are pointed with insulating cement and the protective finish replaced.

8. The insulation is checked after any change in operations. Operating difficulties, such as leaks, water hammer, etc., may also cause damage to insulation so that a prompt check-up follows such occurrences.
9. If insulation has been saturated with water, as a result of fire fighting or flood, the insulation should be brought up to temperature slowly to prevent damage

to the finish due to generation of steam within the insulation.

Copies of the *85% Magnesia Insulation Manual* are available to those concerned with heat insulation by writing The Magnesia Insulation Manufacturers Association at 1317 F. Street, N.W., Washington 4, D. C.

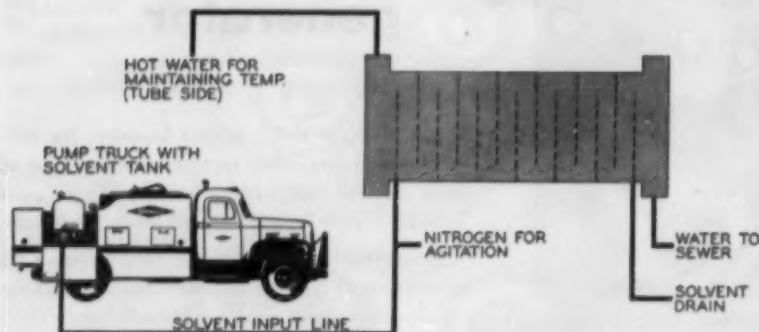
### Flexible Type Mounting For Reed Tachometers

**F**LEXIBLE type mountings for vibrating reed tachometers on refinery centrifugal blowers and

compressors have proved quite satisfactory.

The tachometers were formerly mounted on brackets attached to bearing housings. Instrument reeds vibrated continuously resulting in frequent failures. A flexible support (Masonite, light weight steel strip and steel bar stock) has been designed which will cause no vibration of the reeds unless the instrument is manually pushed against a vibrating part of the unit. Since actual operation of the instrument is reduced to only a few minutes each day, service life of the tachometers should be increased considerably.

By **GLENN PATTON**, Machinist, Machinist Department, Baytown Refinery, Humble Oil & Refining Company, Baytown, Texas.



Hook-up for chemical cleaning shell side of heat exchanger.

### Effective Chemical Cleaning Assures Efficient Operation in Power Plant

**A**N INDUSTRIAL power plant had the problem of preventing losses in production caused by unscheduled shut-downs. When the power plant equipment failed, there was not enough steam available to supply the plant's process machinery.

Scale build-up and metal failures were causing frequent shut-downs of equipment. These outages were making it difficult for the plant to meet its production schedules. The equipment with which the operator was having trouble included two boilers, a continuous blowdown heat exchanger, water filters, a di-

rect heater, and a system of feed-water lines, including a Copes Regulator and Copes by-pass lines.

The operator called Dowell to clean the power house equipment during the annual two weeks shut-down. Dowell engineers analyzed the deposits to be removed and then filled the equipment with the correct chemical solvents. The solvents were allowed to soak for a specified period and then were drained from the units. A water flush and neutralizing boil-out completed the cleaning cycle.

Chemical cleaning not only removed the scale but also disclosed

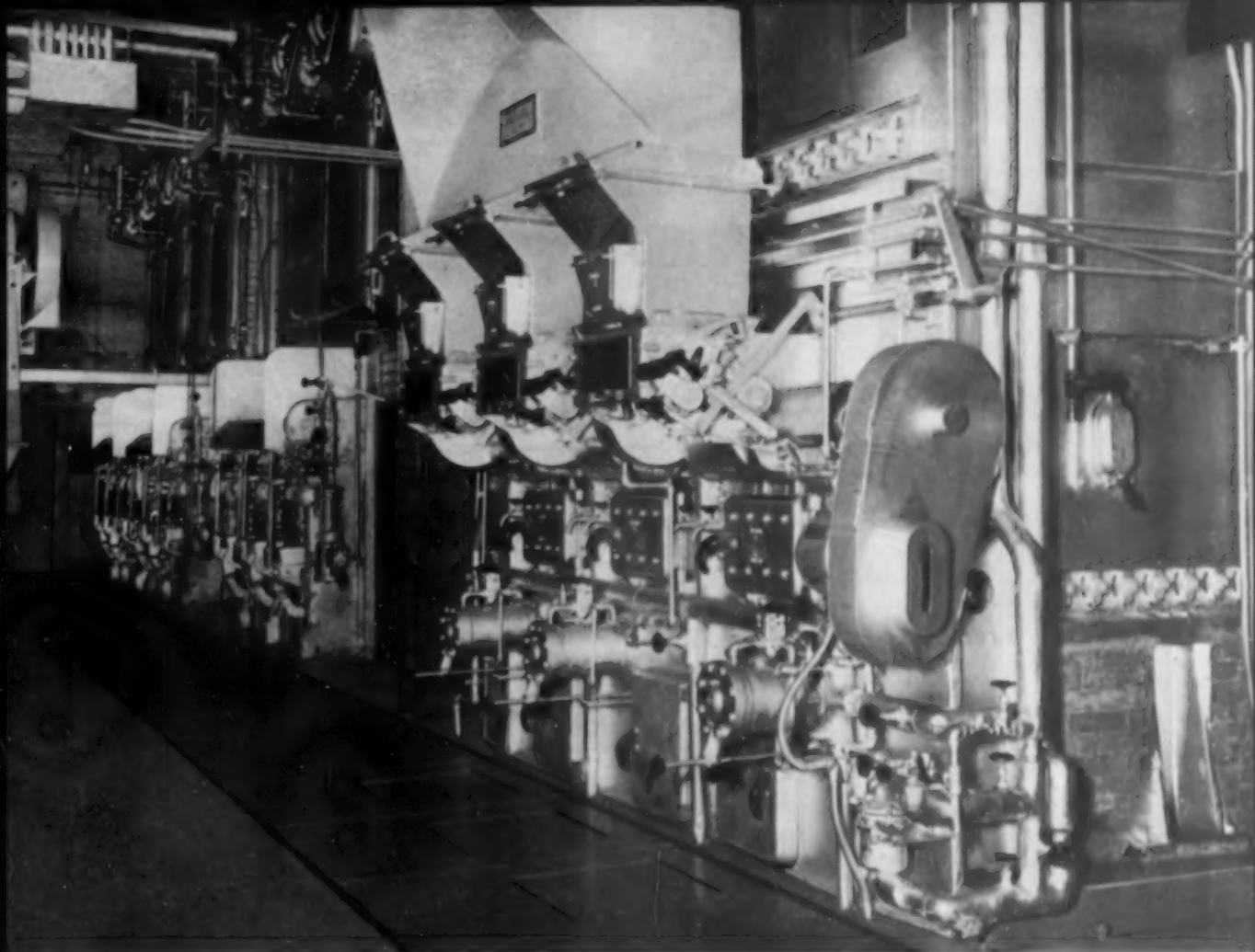


SOLVENT strength is periodically checked during chemical cleaning jobs. This allows the engineer to check the reaction rate of the solvents on the scale, and also to determine when the cleaning is completed.

and allowed repair of weak spots in the power plant equipment.

There was an immediate reduction in shut-downs. Plant production was able to continue on schedule. The operator felt Dowell cleaning had been so effective that he made it a regular part of his maintenance program. By following a yearly schedule of chemical cleaning for preventive maintenance, the operator has practically eliminated power failures and the plant has been able to meet its production schedules.





## **For efficiency and economy of operation, Liggett & Myers burns coal the modern way**

In 1952, the steam demand of the Liggett & Myers Tobacco Co., Richmond, Va., had developed to the point where additional capacity was needed. The firm of Lockwood Greene Engineers, Inc., retained by Liggett & Myers to study the situation, recommended installing modern, automatic coal burning equipment to operate in conjunction with the original boilers. The equipment was installed.

The results have been extremely gratifying. The boiler plant now maintains constant pressure under high steam demand, the steam coal rate has increased 4.1 and there have been no operating difficulties. In addition, other benefits include reduction of labor, satisfactory air pollution control and improved performance records.

### **Investigate Your Fuel Costs**

If you're planning to modernize your plant or build a new one—or if you are just interested in cutting fuel costs—find out how coal, burned the modern way, compares to other fuels. Talk to a consulting engineer

or your nearest coal distributor. Their advice may save you thousands of dollars every year.

### ***facts* you should know about coal**

In most industrial areas, bituminous coal is the lowest-cost fuel available.

Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar.

Automatic coal and ash handling systems can result in a virtually labor-free plant.

Coal is the safest fuel to store and use. No dust or smoke problems when coal is burned with modern equipment.

Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

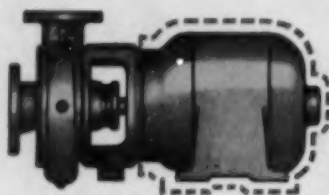
**NATIONAL COAL ASSOCIATION**  
Southern Building, Washington 5, D.C.

# Q.E.D. ...which was to be demonstrated

## Quality



of Ingersoll-Rand Motorpumps is evidenced in the extra-heavy, extra compact design and construction shown above. From suction to discharge a Motorpump is built to the highest standards that can be established.



## Efficiency

is shown by smaller motor hp required to drive the I-R Motorpump. The impeller is precision balanced for peak performance. Design permits short shaft to eliminate deflection and whip. From packing to pump-casing, parts are engineered to make a smooth operating machine that delivers the goods—on every job.



## Durability

is proved by the illustration above. These I-R Motorpumps were installed 4 years ago and paid for themselves in the first 90 days of service. Service is both rugged and continuous, yet, in all this time, there has been no maintenance downtime.

# MOTOR PUMP

Write:

# Ingersoll-Rand

9-220

11 Broadway, New York 4, N. Y.

## Synthetic Resin Coatings

THE Protective Coatings Division of Metalweld, Inc., recently issued an 8-page bulletin describing the various types of synthetic resin coatings available to industry. The company emphasizes that each problem should be carefully analyzed to determine the particular coating that will give the best results. Metalweld is an applicator and not a manufacturer of any one coating. Types of coatings discussed in the brochure are:

**VINYL**—Ranges from a 3-coat single solution to a 7-coat system consisting of prime, body and seal, applied over sandblasted steel or concrete surfaces for the protection of the product from contamination, and for the protection of steel from atmospheric corrosion. Extensively used for food products, gasoline, whiskey, etc., as well as protection against corrosion from acid fumes, spillage, and industrial atmospheres.

**PHENOLIC**—A baked coating having high organic solvent resistance as well as good acid resistance; suitable for storage of food products, formaldehyde, petroleum products, etc.

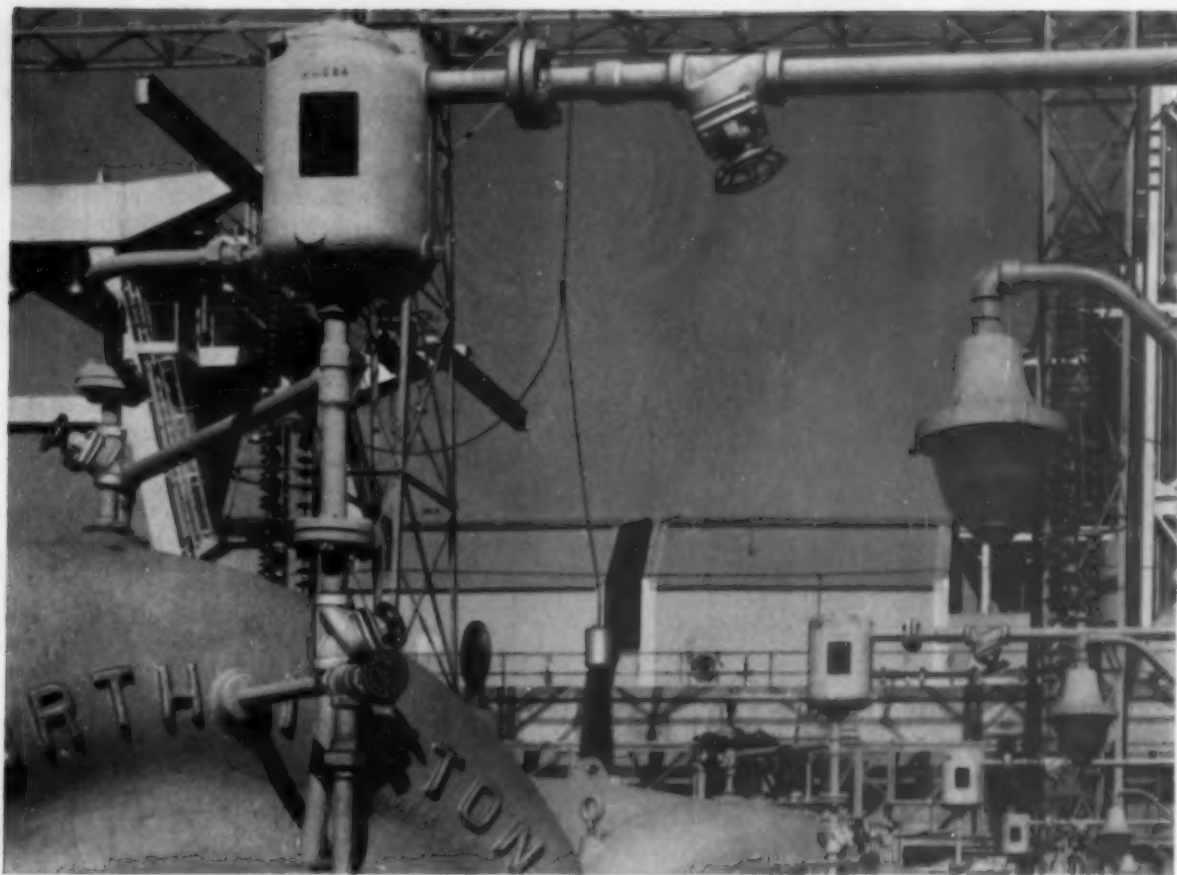
**SARAN**—Applied in multiple coats for the prevention of iron pickup and corrosion in petroleum storage and transportation equipment.

**POLYETHYLENE**—Unaffected by all common inorganic acids and alkalis; has greater resistance to oxidizing agents than any organic coating; is unaffected by common organic solvents.

**EPON**—A new resin having good caustic resistance formulated in a baked coating and an acid catalyst coating; used for the storage and transportation of 73% caustic, alcohol, glycerine, etc.

**NEOPRENE**—Applied over sandblasted surfaces in thickness of .005 in. to .060 in. and vulcanized at approximately 200 F for maximum resistance; has good organic chemical resistance, and resistance to fats, oils, etc.

**PLASTISOL**—A material filling the gap in film thickness between thin coatings of less than 10 mils to sheet linings of 1/4 in. or more;



## Corrosive circulating water tamed here by these CRANE VALVES

**THE CASE HISTORY**—Almost 2 years' operation without any maintenance of valves on circulating water lines to condensers, and on priming and instrumentation systems—with no trouble in sight. That's the experience of Southern California Edison Company's 280,000 k.w. steam station at Etiwanda with Crane Packless Diaphragm Valves.

The plant's engineers knew that sediment in recirculated water would quickly cut out the seats in ordinary valves and its corrosive elements would attack working parts to make valve operation difficult.

Not so with Crane Packless Diaphragm Valves. Their sealed bonnet keeps working parts out of contact with line fluid—free of corrosive effects. Separate disc construction with pliable insert resists erosion—seats tightly even on foreign particles. Large or small, these valves operate easily with fewer turns to the cycle. Typical Crane quality throughout—they're made better to do the job better—a bigger value for the thrifty buyer.

# CRANE CO.

General Offices: 836 S. Michigan Ave., Chicago 5, Illinois  
Branches and Wholesalers Serving All Industrial Areas

### CRANE No. 1610 PACKLESS DIAPHRAGM VALVES

No packing to maintain. Neoprene diaphragm has longer life because it seals the bonnet only—is not subject to the cutting and crushing encountered when also required to do the seating. Separate disc gives control of fluid even should diaphragm fail. Wide selection of materials and sizes. Write for folder AD-1942 or see your Crane Representative.



**VALVES • FITTINGS • PIPE • KITCHENS • PLUMBING • HEATING**

**CRANE'S FIRST CENTURY . . . 1855-1955**



## Plant maintenance ideas and methods (continued)

has good acid and alkali resistance and lessens the possibility of porosity.

**SILICONE** — Coatings designed to have high temperature resistance (in excess of 600 F°); limited in protective qualities in corrosive atmospheres.

### Combination Coatings

Many of the resins can be applied over metallized surfaces in combination with zinc and aluminum. These combination coatings offer the best possible adhesion, and provide a sacrificial undercoating which prevents the possibility of iron oxide formation. The Vinyls, Chlorinated Rubber, Neoprene, and Saran, have been used over zinc and aluminum to offer superior abrasion resistance and continued protection even though the organic film has been broken. Successful

application of sprayed metallic aluminum covered by three coats of Vinyl offers continuous resistance in under-water hull surfaces. Sprayed metallic zinc covered by two coats of Vinyl gives excellent salt water atmospheric protection for bridges, ships, barges, pilings, etc.

### Other Coatings

In addition, other resins have found specific application because of some outstanding property. Acrylics, Asphalt Bitumens, Chlorinated Rubber, Coal Tar Bitumens, Furanes, Mineral Bitumens, Teflon, and Thokol, have been formulated into protective coatings for control of industrial contamination and corrosion.

Courtesy The MW Protective Coatings Division of Metalweld, Inc., Philadelphia, Pa.

## "5:00 O'Clock and Pay Day"

### What Happened to Our Personal Pride?

THE question of what has become of the personal pride in the air conditioning and refrigeration service and maintenance field is becoming more and more a mystery as the industry progresses.

It is apparent that those of us who are responsible for this phase of the industry are becoming more lax in our pride of workmanship, as related to the "good ol' days" when a man was recognized and admired by his desire to do a better job. His sincerity and unwillingness to leave the job until he had satisfied himself beyond a shadow of doubt that his job was well done, and that he had accomplished his purpose.

It has been well said that the service man of today is only interested in 5:00 o'clock and pay day. I am sorry to say there is more truth to this than poetry. It is in effect a matter of fact.

It appears that we have very few real service men in the industry these days. The wide awake service man should perform his duties somewhat in the same manner as does the physician, in the examination, analysis and final diagnosis of his patient's condition.

### "Payoff" Technique

The service man should take the time to listen to the man who owns the equipment which he has been called upon to service, or to listen to, and question the operator. A world of knowledge can be obtained from a systematic questioning of the man who is closest to the equipment — THE OPERATOR. This systematic questioning should be conducted in a sympathetic and understanding manner. Listen to every word of his story, always making notes, which in almost all

cases after the notes are analyzed will give you the answer to the problem.

Never should a bolt or a screw be turned until you are fairly confident that you know what and where the difficulty lies. Armed with this knowledge proceed cautiously and systematically to dismantle the equipment piece by piece. Mark each part to insure that it is replaced in the same position as it was removed, until the part which was determined from your diagnosis is reached. The worn or broken part is replaced and all parts carefully examined for wear or damage as they are reassembled. This does not mean the job is completed, no this is not the time to gather up your tools and leave the job, your toughest job is yet to come.

You must now determine the source of the trouble. Chances are that it didn't just happen. Something caused it to happen. The question now is why? Perhaps it is something not even related to the part you just replaced. Again it becomes necessary to refer back to your notes, and again a careful analysis of the notes may give you the answer you seek. The really worth-while service man's job is never finished until he has located the cause and corrected it to his personal satisfaction.

The ordinary mechanic is another breed. He is told something is broken, he simply puts in a new part and goes merrily on his way. Of course he is back in a very short time to do the whole job over again, because he didn't take the time to correct the cause. Believe it or not the "Johnnie Come Lately" will boast that he is making a name and creating work for himself. He never seems to realize that the work he has created is not for himself, and his name will not be found in the annals of those who care.

By W. C. LINDLEY, Regional Service Manager, Air Conditioning and Refrigeration Division, Worthington Corporation, Atlanta, Georgia.

## Maintenance Supplies

(See page 104)



# **MORE STEAM** **when you need it with** **QC water tube BOILERS!**

Photo shows typical  
installation of a  
100 hp QC Boiler

## **Capacity of 100 hp QC Boiler**

Minimum Safety Valve Capacity  
(ASME Code)

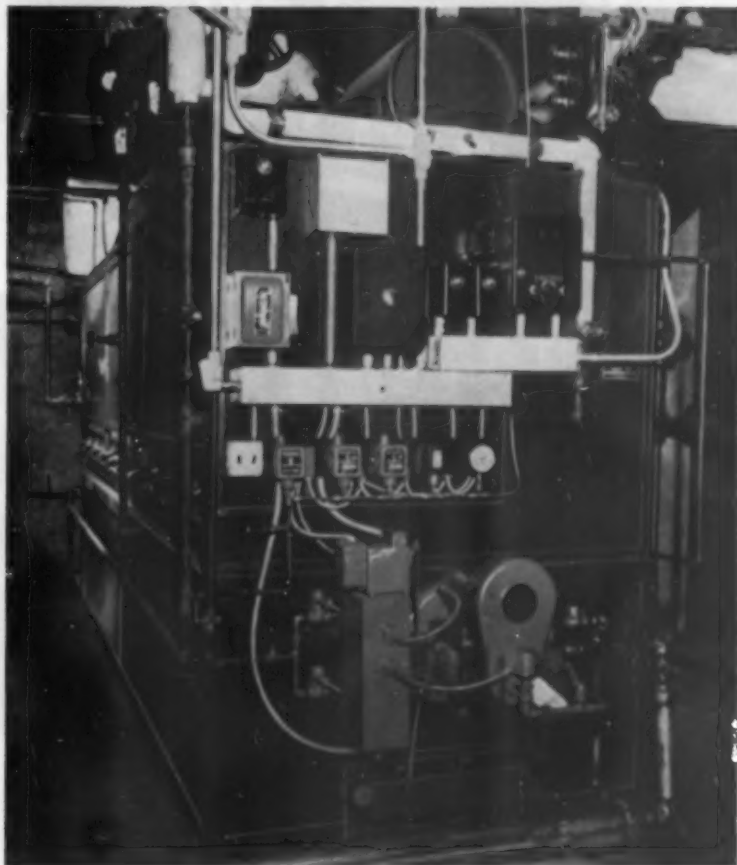
**6578 lbs. steam per hour**

QC Boiler Delivered Steam,  
continuous operation

**4313 lbs. steam per hr.**

QC Boiler Horsepower Rating  
(100 hp)

**3450 lbs./steam/hr.**



Have more steam readily available . . . fast . . . for extra loads when needed or for increased production facilities!

The large reserve capacity of QC Boilers gives you this advantage PLUS normal continuous operation at maximum efficiency.

Your steam capacity stays UP . . . your cost stays DOWN . . . all the time!

QC "bent tube" water tube boilers cost less to operate and require less maintenance. Side panels are easily removable for cleaning and for boiler inspections. Coal, gas or oil-fired . . . from 10 to 350 hp.

For *more* steam, *faster* steam and *drier* steam at less cost, install a QC Boiler in your plant!

*For complete information, write*



**Queen City Engineering Co.**

P. O. Box 3103

CHARLOTTE • NORTH CAROLINA

**wide open...  
or shut tight —  
in a FLASH!**



It takes less than a quarter turn to open an Everlasting Valve *wide* or close it *tight*. That's one of the many reasons why these time-proven valves are so popular wherever quick valve action is desired... on equipment outlets, storage and measuring tanks, process lines, boiler blow-offs, spray lines, meter testing, etc.

**Write for Bulletin E160 describing their many other important advantages and with full information on types, sizes, etc.**

*For "everlasting" service, use*

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EVERLASTING VALVE CO.  
53 PISK STREET, JERSEY CITY 5, N. J.

*Valves*

## How to Save on Steam Trap Repairs

**Q**UANTITY traps do not demand constant attention, but when they do need repairs, maintenance money can be saved by replacing parts not only in the trap requiring immediate attention, but also, in the remaining traps of that series.

For example, assume eight inverted bucket traps were installed on an eight-coil dryer at the time of its installation. When one of these traps becomes worn to the point of needing replacement parts, there is a direct savings if *all* the traps receive new internal mechanisms at the same time.

Several traps draining the same machine, receive approximately the same wear. When one trap becomes worn to the extent of needing new internal parts the others will be soon to follow.

If the remaining traps have an average of 10 per cent, service life before requiring repair, and the cost of a new valve, seat and lever assembly were approximately \$4.00, replacement before absolutely necessary would involve a loss of \$0.40 per trap. However, the labor cost involved will more than make up for this loss.

The cost of labor involved to service one trap is \$1.15. Therefore, repair labor for eight traps serviced individually would cost approximately \$9.20.

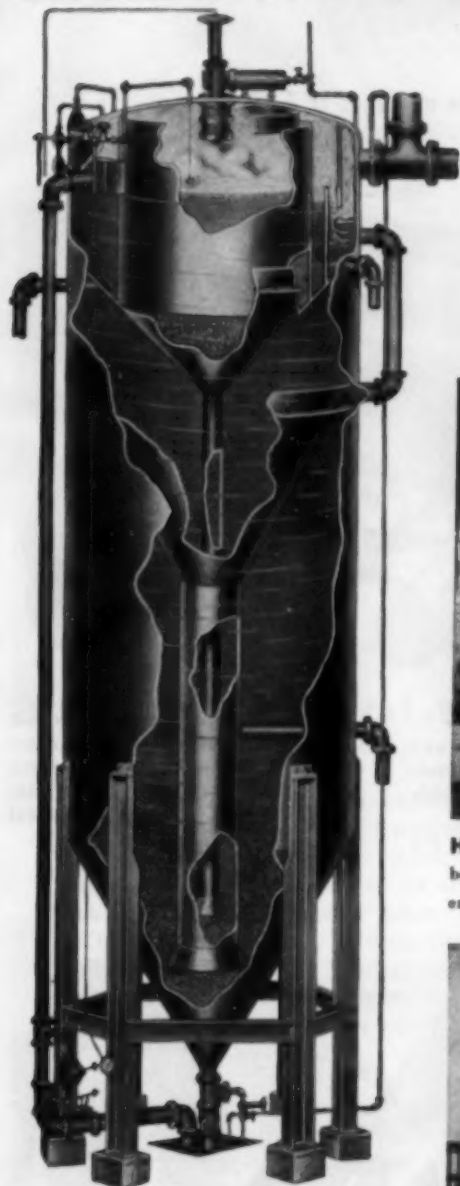
The cost of labor involved to service all eight traps at the same time is only \$4.20. This leaves a labor profit of \$5.00.

The loss of \$0.40 per trap times the remaining seven traps is \$2.80. Subtracting \$2.80 from \$5.00 leaves a profit of \$2.20 gained by servicing all eight traps at the same time.

Thus, if traps are put on regular maintenance schedule and assembly-line servicing is employed, a very definite profit can be shown, plus the assurance of maximum operating economy at all times. Traps are kept in tip-top shape, eliminating steam or fuel waste that might occur if the trap is not caught before it goes bad.

Courtesy Armstrong Machine Works.

# In Hot Process Softening, too BELCO Builds a Complete Line.



Illustrated literature "Belco In Pictures" is available on request. Write for copy, today.

## Belco

*Processes for  
Removal of Water Impurities*

**BELCO DESIGNS ENGINEERS & FABRICATES WATER PROCESSING EQUIPMENT**

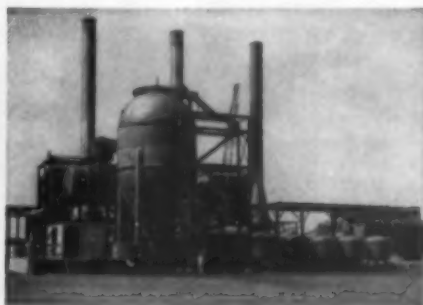
Belco-designed equipment provides high operating efficiency at low operating costs. Many of the country's largest industries rely on Belco for their water conditioning equipment. For example, Belco has built the largest fully automatic demineralization plant in the world and is currently furnishing one of the largest hot lime zeolite installations. A consultation with Belco could lead to lower operating costs for you, too. Write or call for technical assistance at any time.



**HOT LIME SODA** — Installation in boiler house at large eastern oil refinery. Has capacity of 200,000 lbs/hr.



**HOT LIME SODA** — Installation in large southwestern utility. One of three units with 90,000 lbs/hr total capacity.



**HOT LIME BELCOLITE** — Installation at large southern chemical company. Capacity 600,000 lbs/hr. This plant embodies "thoroughfare" operation of separate desecrator and hot process tank. The large hot process tank was designed, built and erected by Belco under its contract with customer.

Boiler Feedwater Heaters • Water Softeners • Filters • Clarifiers  
Demineralizers • Automatic Process Control Panels

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REGIONAL OFFICES: Philadelphia, Pa., Chicago, Ill., Houston, Texas  
North Hollywood, Cal., Montreal, Que., Toronto, Ont.

Representatives in all principal cities of the United States and Canada

# Equipment . . Supplies . . Methods

FOR FREE INFORMATION—Circle code number on pages 16 & 17

## Portable Maintenance Inspection Tool & Kit

**E-1** MAGNAFLUX CORPORATION, 7300 W. Lawrence Ave., Chicago 31, Ill., has introduced an entirely different magnetic particle inspection kit which offers light weight, portability and low cost.

This Y-5 Yoke Kit comes in a metal carrying case, about the size of a fishing box, and weighs less than 30 lb. complete. The Yoke itself is the magnetizing and testing instrument and weighs only 7 lb. Magnaflux powder, powder bulbs, and operating instructions complete the kit. The Yoke is equipped with a 100 ft cord. It draws only 6 amps from any 110 volt a-c line. Price is about \$185.00.

One man performs the inspection by himself. He handles the Yoke with one hand, both power control and positioning, and with the other he dusts on the Magnaflux powder. The area covered by each application of the



Yoke varies up to approximately 24 sq in., and the Yoke is so light and easily positioned that large areas, many parts, or many feet of welds can be inspected per man hour.

The kit is designed especially for

preventive maintenance inspection, for weld inspection, and for limited volume inspection of any magnetic part wherever surface cracks are suspected. This use is very pertinent to salvage operations.

## Hydro/Steam Cleaner

**E-2** VAPOR HEATING CORPORATION, 6420 W. Howard St., Chicago 31, Ill., has developed a new portable Vapor-Clarkson Hydro/Steam Cleaner Model 4989-G which jets out 1200 gallons of hot water an hour at 240 lb pressure.

An automatic 40 hp steam generator in the unit develops 120 lb working steam pressure in two minutes from cold water and over 1100 lb of steam per hour which is directed through a Sellers Injector where the steam heats the water and the pressure is increased by a venturi in the injector.

The unit is mounted on a two wheel trailer, enclosed in a trim metal cabinet with large doors so the operator can easily reach all controls. Fuel tanks for eight hours of operation and a float control water supply tank are incorporated in the cabinet. High

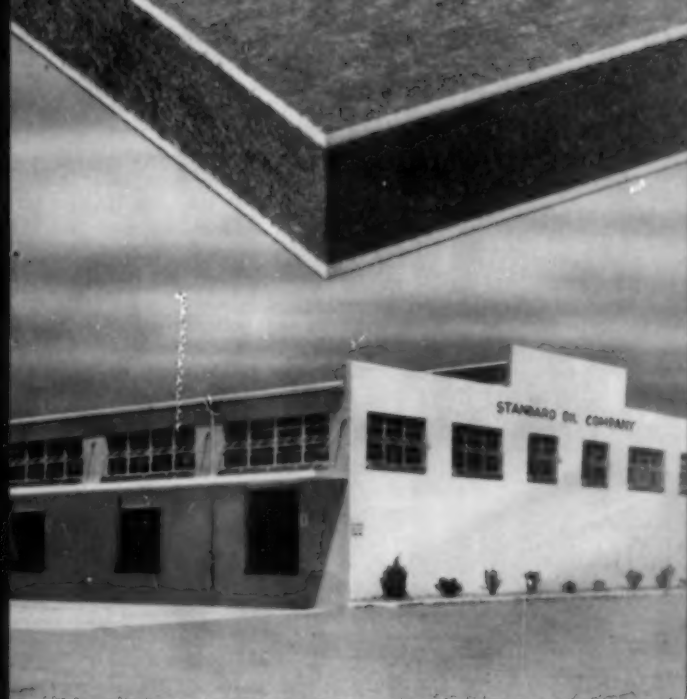


pressure steam hoses and a cleaning gun are included with the unit.

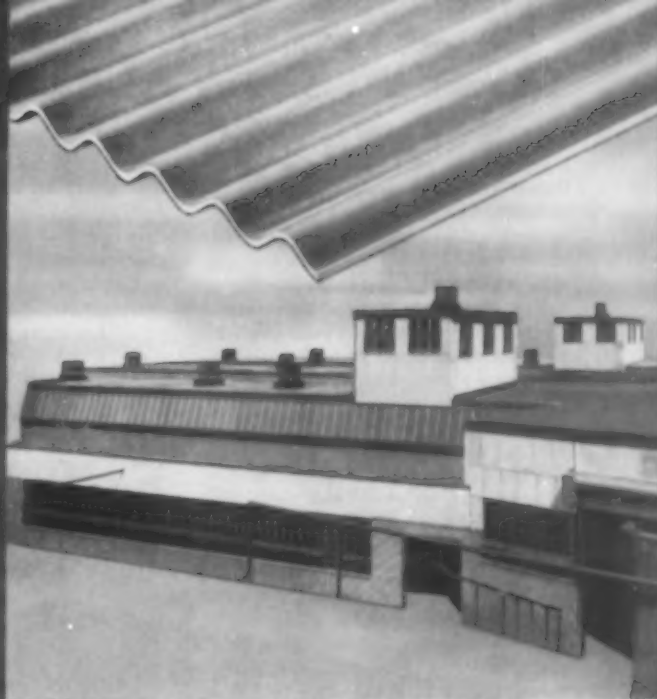
Automatic controls on the steam generator cause the machine to make steam only when the cleaning gun is turned on. However, the steam generator automatically cycles on and off to hold the working steam pressure.

A 4.5 hp gasoline engine drives the steam generator's feedwater pump, blower, fuel pump and magneto for constant ignition, or a 2 hp electric motor may be used. Hot gases from the forced draft fuel-oil fire in the steam generator wipe over the patented steel coils and turn the water





**One material** — Carey Thermo-Bord structural insulation panels — does work of three at this Standard Oil Co. (Ky.) warehouse. Combines roof deck, insulation and interior ceiling finish.



**Ease and speed of** erecting exterior sidewalls of **Careystone Corrugated** helped Superior Foundry Company, Cleveland, Ohio build new 60,000 sq. ft. plant in six weeks — economically!

## 2 ways out of the building cost squeeze

As long as cost is a major problem in construction of new buildings and modernization of old ones, the search for more economical methods and materials will go on. In many cases, however, it ends when Careystone Corrugated and Carey Thermo-Bord come on the scene. Careystone Corrugated has numerous advantages for exterior sidewalls and roofing. It is economical in cost; easy to apply over wood or steel framing; strong and rigid. Made of asbestos and cement, it is practically indestructible . . . won't burn, rust, rot, corrode. No painting or preservative treatment is ever needed.

Great savings in material and labor can be

made by using Carey Thermo-Bord 4' x 12' Structural Insulating Panels for roof deck construction. Thermo-Bord combines structural deck, insulation and interior ceiling finish in one rigid unit. And its light weight means lighter-weight structural members can be used to gain more dollar savings. Made by bonding tough asbestos-cement board to a specially processed insulation core, Thermo-Bord is also recommended for low-cost insulated outside walls and partitions.

Get the facts on these Carey cost-savers. Write for free descriptive literature today. Or, ask your Carey Industrial Sales Engineer to pay you a visit. Address Dep't. SPI-5.

# Carey

**The Philip Carey Mfg. Company**

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Serving Industry, Farm & Home since 1873 . . .

Flat Asbestos-Cement Sheets • Built-up Roofing • Bonded Roofs • Super-Light 85% Magnesia Insulation • Careyduct • Asphalt Plank • Asphalt Paints and Coatings • Fiberflex Glass Roof System

SAVE MONEY AND PROTECT YOUR PLANT BY

## Equipment . . Supplies . . Methods (Continued)

pumped through the coils into steam. Steam pressures can be changed from 75 to 290 lb pressure by adjusting one control. The steam generator consumes nine-gallons of fuel-oil per hour when it is running steady.

The cleaner is equipped to do effective cleaning in three ways: by jetting out 180 degree water under 240 lb pressure, by jetting hot water under pressure mixed with a cleaning detergent and steam cleaning with or without detergents.

The Vapor-Clarkson Hydro/Steam Cleaner was designed to do the heavy duty cleaning jobs in industry where a large volume of hot water under pressure is needed for: cleaning railroad box cars and freight trucks, remove odors and difficult materials in food and chemical processing plants, decontaminate buildings and equipment in areas damaged by flood waters.

### Clip Protects Condenser Tube From Erosion

#### E-3

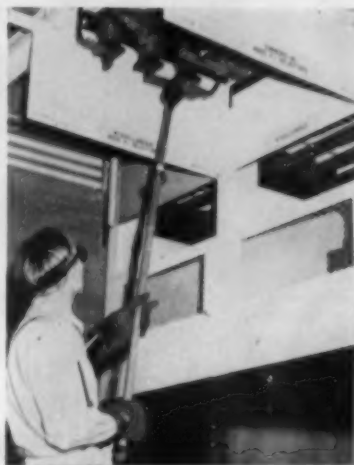
ALLIS-CHALMERS MANUFACTURING COMPANY, P. O. Box 512, Milwaukee 1, Wis., has announced a stainless steel clip to protect condenser tubes from erosion.

The open side stainless steel clip, made from 26 gauge metal with slightly flaring sides for tension, is attached directly to the condenser tube. The clips are available in 2-ft lengths for  $\frac{1}{4}$ ,  $\frac{3}{8}$  and 1-in. diameter condenser tubes.

Use of the clips does not appreciably affect heat transfer rate of the

condenser tube. While the clip does not repair an eroded tube, it resists further erosion and in many cases it may not be necessary to replace the clip-protected tube for a considerable period of time.

Occasional inspection of condenser tubes for signs of erosion will determine whether protector clips should be applied.



High voltage testing device uses Synthane laminated plastics for safety.

### High Voltage Testing Device

#### E-4

R&E EQUIPMENT DIVISION, I-T-E CIRCUIT BREAKER COMPANY, Greensburg, Pa., has introduced a simplified live line detector, fabricated almost entirely of Synthane thermosetting laminated plastics to provide a safe, practical method of checking the electrical potential of all types of high voltage lines and equipment.

Named the "Glowtector," this unique safety device detects voltage by means of a small gas-filled tube which glows brightly upon contact with a-c voltages from 2200 volts upwards including 500,000 volts and frequencies of 25 or more cycles.

The unit consists of an electrode which is touched to the line or equipment being tested, a glow tube, and a hood which shields the tube to insure maximum visibility when used on outdoor equipment or in bright daylight. The assembly is mounted on several handle sections as determined by the voltage under test.

The operation of the unit is extremely simple. If the tube glows when the electrode is touched to a line, that line is hot. If the tube does not glow, the line is dead. The unit is self-contained; no auxiliary equipment or ground connection is required.

The overall weight of the unit is kept to a minimum through the use of laminated plastic tubes for the three sections which make up the handle assembly.

The recommended procedure for tests is to touch the electrode to a known live conductor operating at 2200 volts or more, or to the spark plug of a running engine. This establishes the condition of the glow tube. With the tube thus checked, the electrode is applied to the equipment or circuit to be tested. If the tube fails to glow (indicating a dead line) a final precautionary check is made on the known voltage to verify the operation of the tube. Tests thus made verify quickly and accurately whether the equipment is safe to touch.

### Dehydrator and Filter for Compressed Air

#### E-5

THE HANKISON CORPORATION, 951 Banksville Road, Pittsburgh, Pa., has engineered and designed two new models of its "Condensifilter" for removing moisture, oil, and dirt particles from compressed air.

These models, the M-30 and M-100, are rated at 30 and 100 cfm of air compressed to 100 psig. Both models feature a condenser to reduce compressed air dew points by cooling, plus a disposable filter cartridge for removing solid particles from compressed air. The new prefabricated steel case has a spun elliptical head that permits operating pressures up to 200 psig. All pressure seals are "O" rings, eliminating the need of tools to dismantle the units for service.

In operation, compressed air enters the Condensifilter through the steel center shaft and passes into the spiral condensing section containing over 940 sq. in. of heat exchange area. The condenser reduces the temperature of the compressed air to within one or two degrees of the coolant temperature. The air then passes upward and through the cotton felt cartridge, re-enters the center shaft, and returns to the distribution system. Condensed vapors drop into the condensate collection chamber to be manually discharged, or by installing a compressed air trap, automatically discharged.



SAVE MONEY AND PROTECT YOUR PLANT BY

# Installing Hancock 1500# and 2500# Steel Valves and assuring dependable leak-proof service

Put an end to the costly hazards of valve leakage in your high-pressure, high-temperature steam plant! Let proved-in-the-line Hancock 1500# and 2500# Valves assure the safe, reliable performance so essential to protect personnel, plant and service to customers.

Hancock 1500# and 2500# Steel Valves are preferred by most design and operating engineers in modern steam plants for very practical reasons. There is no bonnet joint to leak, no gasket to leak, no seat insert to leak! In fact, these rugged valves have every design, quality and construction feature essential for the severest services. Get complete information, then try one of these heavy-duty valves. You will soon agree that . . .

**When Hancocks go in, valve costs go down!**

#### SIZES:

¼" through 2"  
Outside Screw  
and Yoke

#### SERVICE RATINGS:

**Screwed and Socket  
Weld Ends:** For all  
pressures up to 2500 psi  
at 1050° F., O.W.G.  
6000 psi—100° F.

**Flanged Ends:**  
For all pressures  
up to 1500 psi  
at 900° F., O.W.G.  
3600 psi—100° F.



YOUR INDUSTRIAL SUPPLY DISTRIBUTOR is as close as your telephone. You can depend on his recommendations and service to save you time, trouble and expense.

In Canada: Manning, Maxwell & Moore of Canada Ltd., Galt, Ontario

## HANCOCK VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** Watertown 72, Massachusetts

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'CONSOLIDATED' SAFETY RELIEF VALVES, Tulsa, Okla. AIRCRAFT CONTROL PRODUCTS, Danbury, Conn. and Inglewood, Calif. "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.



## new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

### Teflon Yarn Packing

**E-6** CRANE PACKING COMPANY, 1800 Cuyler Ave., Chicago 13, Ill., has developed a new Teflon yarn packing, designed to function at higher peripheral speeds than ordinary braided tape or molded forms of Teflon.

The anti-frictional properties of Teflon combined with the softness, resilience and fluid retentive properties of fine fibre construction enables the packing to run substantially cooler than other types.

The new packing affords all the anti-corrosive, thermal, mechanical and other inherent advantages of Teflon. It is tightly braided by means of a special process to provide density and firmness and to eliminate large voids. Where some type of lubricant is required the packing can be impregnated with fluorolube or other satisfactory lubricating material. It is especially recommended for rugged and corrosive service on pump shafts and valve stems. Available sizes are  $\frac{1}{8}$ " through  $\frac{1}{2}$ ", 1/16" gradations.

### Parts Cleaning Machine

**E-7** STORM-VULCAN, INC., 2225 Burbank St., Dallas, Texas, announce a new addition to their complete line of Turbo-Blast parts cleaning machines for industrial application.



This machine is Model No. 40, which is designed for utilization of a small working area—unobstructed working area on the sides and front—with volume cleaning capacity.

It is only 40 in. from the floor, which makes loading and unloading fast and easy, saving valuable work

time. It is claimed that the super agitation created by two powerful impellers is equal to vigorous hand-scrubbing. The cleaner has a tank size of 5' x 3' x 2' (solution fills to 18" deep); heating of the solution is by gas or steam; solution capacity is 185 gallons; impellers driven by two  $1\frac{1}{2}$  hp single phase motors.

### Electronic Speed Drives Feature Printed Circuits

**E-8** GENERAL ELECTRIC COMPANY, Specialty Control Department, 1 River Road, Schenectady, N. Y., has introduced a line of "Thy-mo-trol" electronic adjustable-speed drives featuring printed circuitry and a new, simplified control system, available at prices approximately 20% lower than previous models of the same type.



Believed to be the first printed circuitry ever to be incorporated in industrial control equipment, the print-board panels can be visually inspected for circuit faults, since the panels are actually current-carrying diagrams. The panels can also be removed and replaced in a few seconds time.

Since the new control circuit uses only a single miniature-type control tube, as contrasted with three conventional sized tubes in previous models, maintenance on the equipment is greatly simplified.

The new design has isolated a-c control circuits that allow inter-connection with a-c drives without the use of additional relays. Power tube capacity is at least 40% greater than the full load current of the motor with which it is normally used.

The new design is available in two ratings,  $\frac{1}{4}$  to 1-hp, and  $1\frac{1}{4}$  to 3-hp full wave.

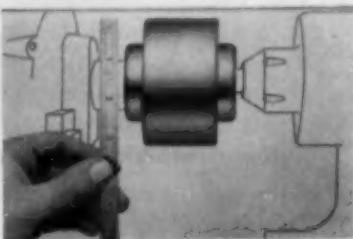
Basically an automatic electronic control for d-c motor drives, the new Thy-mo-trol controls are designed to give stepless speed control from an a-c power source over an 8 to 1 speed range, with higher speed ranges possible for special applications. Consisting of electronic sensing elements and an electronic power rectifier, it maintains very close speed regulation regardless of changes in load or line voltage, and limits starting torque to protect both drive and machine against overloads at all times.

### Small Shaft Coupling

**E-9** SIER-BATH GEAR & PUMP Co. INC., 9252 Hudson Blvd., North Bergen, N. J., announces a new low priced coupling for connecting  $\frac{1}{8}$ " to  $1\frac{1}{4}$ " shafts.


The "Medium Duty" is of the gear type, but differs widely from the conventional design: it has a one-piece smooth sleeve, and the sleeve and hubs are made of powdered steel.

The simplified 7-part design and low cost fabrication method make possible a price low enough to put the new coupling in direct competition with chain, pin-and-bushing and flexible disc or grid types—commonly used for medium-to-heavy duty service between small shafts. Advantages of the new coupling over these types are: lower price than most; positive gear drive; higher horsepower capacity; can be run at higher speeds; more compact; can be assembled and uncoupled in seconds; smooth exterior is as safe as smooth shafting; less maintenance required; longer service life.



The coupling is manufactured in one size only, to accommodate shafts from  $\frac{1}{8}$ " to  $1\frac{1}{4}$ ". Asbestos-Neoprene seals—highly resistant to heat and corrosion—keep out foreign matter, seal in lubrication. Snap rings are spring steel—are simple to install and remove—yet withstand 50,000 lb of end thrust. Bore sizes are from  $\frac{1}{8}$ " to  $1\frac{1}{4}$ ", with standard keyways and set screws. Initial grease lubrication lasts up to two years.





**SMALL  
CARRIER...**

**HANDLES  
BIG LOAD**

*...naturally it's*

## **AMERICAN MONORAIL**

This American MonoRail Monotractor unit, recently installed in a rug and carpet warehouse, dispatches hard to handle, big bulky loads over a wide area. Fully automatic, with finger-tip control, with a hoist capacity of 1,000 pounds, this installation is **SAVING 200 MAN HOURS PER WEEK.**

This is another of the many examples of American MonoRail engineering for low-cost, efficient overhead handling. Let your American MonoRail representative explain the versatility, low cost and low maintenance of American MonoRail equipment. Consultation in connection with any handling problem is available without obligation.



**AMERICAN**

OVERHEAD  
HANDLING  
EQUIPMENT

# **MonoRail** COMPANY

13105 ATHENS AVENUE • CLEVELAND 7, OHIO  
[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

## Equipment . . Supplies . . Methods (Continued)

### Moisture Indicator

#### E-10

ANSUL CHEMICAL COMPANY, Marinette, Wis., has developed a unique new device which performs the dual job of indicating when moisture is present in the refrigeration system and then removing it.



By glancing at leak-proof window on top of indicator fitting, serviceman can determine approximate moisture content of refrigerant without shutting down system.

Known as the Ansul Dry-Eye System, the device makes it possible for refrigeration maintenance men or owners to see and analyze at a glance the approximate moisture content of the refrigerant without shutting down the system.

The leak-proof window of the unit contains a special indicating element which changes color depending on the moisture content of the refrigerant. When the window shows blue, the refrigeration equipment is dry. If it's pink, then moisture is present.

The new device has far-reaching implications for the entire industry because acid and sludge—the two most frequent causes of refrigeration system breakdown—invariably result from the presence of moisture. By spotting moisture trouble in its earliest stages, it will be possible to avoid serious difficulties later.

### Silver Alloy Brazing Flux

#### E-11

HANDY & HARMAN, 82 Fulton St., New York 38, N. Y., are offering a special flux for silver alloy brazing of stainless, chromium heat resisting alloys, chromium and tungsten carbides.

Called Special Handy Flux Type B-1, the new flux is designed to reduce oxides of the refractory metals while protecting the underlying metal from further oxidation during brazing.

An important feature of the new flux is its ability to withstand heating at 1400-1600 F for short times and to increase its life at lower brazing temperatures. The key to the unusual performance of the flux is that it contains a strong deoxidizer and one whose oxide is a flux former. In a sense the flux regenerates itself during the heating cycle and thus provides the longer activity span required for elevated temperatures. After brazing, the flux can be removed readily with hot water.

### Heavy-Duty Vacuum Cleaner

#### E-12

THE BLACK & DECKER MFG. Co., Towson 4, Md., announces a new heavy-duty electric vacuum cleaner for industrial use.

Called the No. 95 Vacuum Cleaner, this unit has up to 20% more cleaning power, a dry capacity of 1½ bushels of dirt, and a wet recovery capacity of 13 gallons. The cleaner will move 75 cfm of air through a one inch orifice, and has a maximum sealed suction rating of 70 in. of water. The motor, rated at 1¼ hp, is designed especially for vacuum cleaning. It is



sealed against dirt and water, and has its own cooling fan.

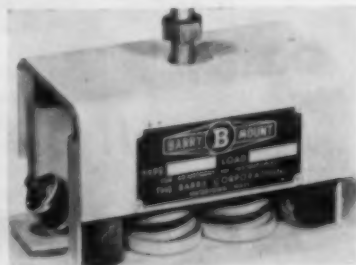
An outstanding feature of the new cleaner is the super flexible, accordion type hose offered as standard equipment. This accordion-type hose measures 5 ft, but may be expanded to measure 15 ft. The hose has a 1½ in. diameter throughout its length, thereby permitting the passage of more air for more thorough cleaning. Further, this enlarged hose diameter makes possible the pick-up of larger objects without the danger of clogging, and greatly adds to the operating performance and efficiency of the machine.

Additional features of the new B&D Vacuum Cleaner include a removable pushcart type handle for easy maneuvering. The square steel tank has four 3 in. casters that allow towing the cleaner by the hose with no danger of tipping. Both hose and electric cord may be carried on top of the machine without interfering with switch operation.

### Machinery Mount

#### E-13

THE BARRY CORPORATION, Watertown, Mass., announces a new machinery mount for isolating low speeds and high impact applications.



New Barry Spring Mount for isolating low speeds and high impact applications has adjustable damping feature.

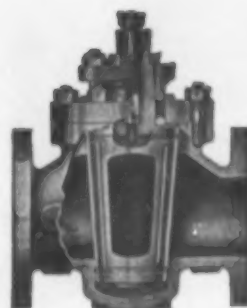
The "Spring Mounts" are designed for use where high absorption of vibration is necessary or where soft floors make control of vibration frequencies difficult.

Available in five sizes, with 1, 2, 4, 6, or 9 springs, the mounts have an effective load range of from 250 to 6700 lb per mount. Since there is no need to bolt or shim when machines are mounted on Spring mounts, machines can be installed and leveled within a matter of minutes. Each mount has a built-in adjustment which permits leveling up to ¼ inch.

An exclusive feature is adjustable damping. Simple damping adjust-

# ● VALVES

# ● PIPE FITTINGS



Walworth  
Lubricated Plug Valve



Walworth  
Steel Gate Valve



Walworth  
Iron Body Gate Valve



Walworth  
"500 Brinell" Bronze Globe Valve



Walworth  
Iron Body Saddle Gate Valve



Walworth  
Cast Steel Flanged Fittings

Walworth manufactures a *complete line* of valves and pipe fittings: all made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties. In design, construction, and performance, Walworth products reflect more than a century of experience in the manufacture of quality valves and fittings.

Your Walworth distributor will give you full information on the *complete line* of Walworth steel, iron, and bronze, and special alloy valves and pipe fittings; also Walworth Lubricated Plug Valves, and Walseal\* valves, fittings and flanges. Ask for this information today.

\*Patented—Reg. U. S. Pat. Off.

## WALWORTH

### valves and fittings

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

SOUTHERN POWER & INDUSTRY for MAY, 1955



**DARTS  
ARE THRIFTY  
ON THE  
POCKETBOOK**

**... TIGHT  
ON THE  
LINE!**

Yes sir, Dart Unions cut costs because

1. They last longer — their two bronze seats are precision ground to a true ball joint.
2. They're easy and fast to install.
3. They stay tight — damage no property, spoil no work.
4. They can be used over and over again.

Which is why the answer to "How thrifty, how tight can you get is . . . GET DARTS"!

#### QUICK FACTS

- Leakproof because precision-machined to a true ball joint and spherically ground
- Shoulders are heavy — can take abuse
- Each Dart is individually vacuum-tested
- Bronze alloy seats are extra wide, resist pitting and corrosion
- Practically indestructible nut and body — of air-refined, high-test malleable iron

**DART UNION COMPANY**  
Providence 5, Rhode Island

*The Fairbanks Co., General Distributing Agents*  
Boston • New York • Pittsburgh • Rome, Ga.



CALL YOUR LOCAL DISTRIBUTOR FOR PROMPT DELIVERY OF DART UNIONS

#### new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

ments can be made to prevent sudden spring recoil when a mount is subject to heavy impact and shock and when mounted unit goes through resonance, thus checking excessive machine motion or bounce. The dampers are faced with friction brake linings, acting on the steel surfaces, which dampen horizontal as well as vertical forces.

Some typical examples of where Barry Spring mounts could be effectively used include drop forge hammers, heavy stamp presses and hydraulic presses. Also, in buildings with flexible wooden floors or on balconies where the building construction creates difficulties for effective vibration isolation.

#### Heating Unit for Cold Storage Doors

**E-14** JAMISON COLD STORAGE DOOR COMPANY, Hagerstown, Md., has introduced a new type of heating unit known as Frostop, which prevents the formation of ice on the frames of low temperature and freezer doors.

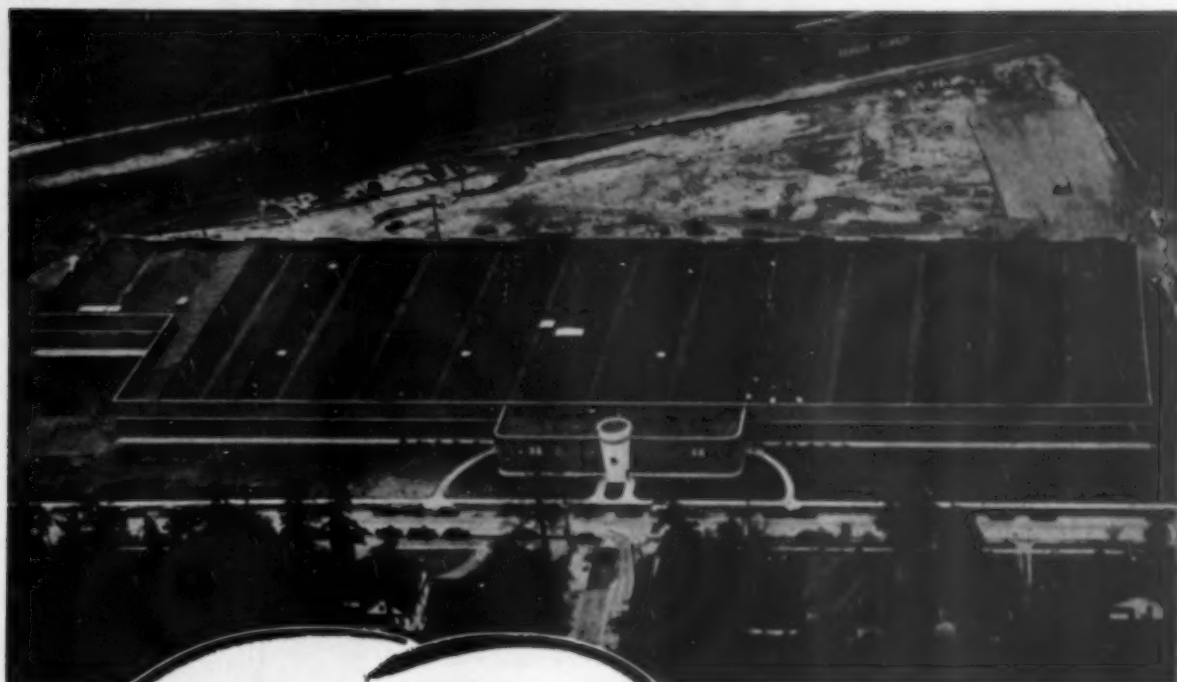
The unit consists of cables thermostatically controlled and embedded in the frame where the gaskets of the door make contact. They are laid in asbestos lined channels cut in the casing. When desired, they may be embedded also in the sill.

In operation, the heating unit keeps



Frostop heating unit keeps cold storage doors from freezing to frame.





**Before you Buy  
Air Conditioning  
it will pay you to  
investigate . . .**

Aerial view of the Lilly Tulip Cup Corporation's plant, Augusta, Ga. This April Showers Roof Cooling installation, using 489 spray nozzles on its 108,868 square feet of roof area, reduced the air conditioning tonnage by 100 ton. Same system, without a true air conditioning system, will lower inside temperatures by 8° to 15°.

*April Showers is Patented*

## **April Showers**

**Automatic Evaporative**

**ROOF COOLING**

**Spray Method**

**Over 19,500,000 Square Feet of Roofs Cooled  
by April Showers. Ideal for Southern plants.  
No Run-off. Absolutely Fool-proof. Low Cost.**

*(Partial List of Users)* E. I. duPont de Nemours & Co., Inc. (STORES: 19,549 sq. ft., Shops: 17,772 sq. ft., Shipping Dept.: 43,902 sq. ft.), Martinsville, Va. • Calhoun Garment Co., (44,660 sq. ft.), Calhoun City, Miss. • Williamson Hosiery Mills (5,430 sq. ft.), Athens, Tenn. • Saxon Trouser Company (20,000 sq. ft.), Aberdeen, Tenn. • Athens Hosiery Mills (2,553 sq. ft.), Athens, Tenn. • Livingston Shirt Corp. (24,544 sq. ft.), Livingston, Tenn. • The Russell Mfg. Co., (40,640 sq. ft.), Alexander City, Alabama. • Write-Right Mfg. Co., (44,352 sq. ft.), Chamblee, Ga. • Appalachian Mills (10,889 sq. ft.), Knoxville, Tenn. • Eastman Cotton Mills (30,785 sq. ft.), Eastman, Ga. (And such others as): Lilly Tulip Cup Co., Westinghouse Electric Co., Bulova Watch Co., General Electric Co., Eastman Kodak Co., and many others.

**\* Besides cooling "under-roof" areas, April Showers adds longer life to roofs, gives added protection in case of fires and acts as a lightning arrestor.**

**Here are some of the reasons why so many Companies  
install April Showers on their new or old buildings**

**• Increases employee efficiency • Lowers temperatures of upper floors 8° to 15° • Reduces loads of true air conditioning systems as much as 25% • Used on all types and shapes of roofs on Industrial, Commercial and Residential buildings • Thermostatically controlled; no pool, no run off • Installation is simple, inexpensive, fool-proof • Operating and maintenance costs are negligible • Spray Method is far superior to Ponds.**

**Automatic Roof Cooling, the logical first step in any Air Conditioning program . . . WRITE FOR COMPLETE INFORMATION OR FREE ESTIMATES.**

**APRIL SHOWERS CO., INC.**

**WASHINGTON 11, D. C.**

## new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

the gasket contact areas of the frame above the dew point temperature. This prevents moisture condensation and thus eliminates the formation of frost or ice at excessively low temperatures . . . even below minus 50 F.

While prolonging the life of the gasket, the unit also reduces other maintenance costs on the doors and frames. It gives a tighter and more dependable seal, minimizes refrigeration loss and removes the danger of damage when freezing calls for the crowbar.

It is completely encased in a lead sheath and, along with a thermostat, is set in flush with the surface of the frame.

### Engine Wear Meter

**E-15** THE GERIN CORPORATION, Avon, N. J., has announced a new gauge which may be permanently attached to any engine to warn the operator when there is fuel dilution, water or antifreeze



leakage, running on dead filters, wrong grade make-up oil and the like.

The meter responds to any increase or decrease in viscosity. Viscosity is said to be the best and most sensitive indicator for changes in the crankcase oil which the operator must guard against to avoid rapid wear of piston rings, cylinder bores, timing gears and other parts that otherwise do not last as long as the rest of the engine.

Unlike previous instruments, this meter does not respond to the normal thickening or thinning of the oil incidental to varying operating temperatures. Hot or cold, the indicating hand points only to true and permanent changes. Accuracy within 1% is claimed and therefore the meter does not show the oil up a little on one reading and down the next.

### Safety Switch for Hoists

**E-16** W. C. DILLON & Co., Inc., P. O. Box 3003, Van Nuys, Calif., has developed a new 20,000 lb capacity Dyna-Switch to prevent overload damage to hoisting equipment by automatically cutting out lifting power whenever the safety maximum is exceeded.



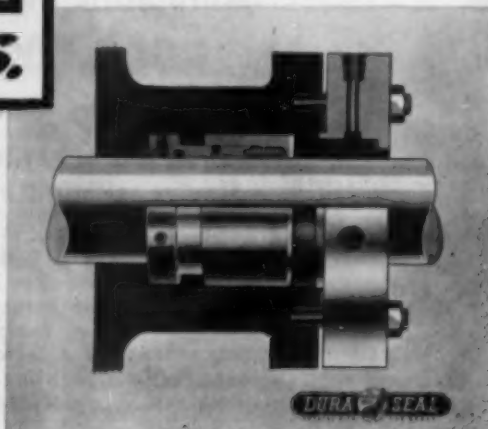
This is done by means of a massive U-shaped bar of high grade tool steel, heat treated to flex millions of cycles without losing its resiliency. Attached between the load and the hoist, it trips a sensitive micro-switch whenever the bar is deflected beyond its pre-set operating point, thereby breaking the lifting circuit.

Accuracy of the new model is within 1/4 of 1%, with a safety factor of 3 1/2 to 1, thus permitting accidental overloads up to 70,000 lb with complete safety and without damage to calibration. This safety factor is managed by a free-riding stop bolt at the open end of the U-shaped bar. This bolt restrains the bar against deflecting more than 21,000 lb even though much greater loads are imposed. Lifting eyes of the Dyna-Switch are electrically welded in position.

## DURA SEAL TYPE-P.S.

A Single Balanced Mechanical Seal for Light Hydrocarbons at High Pressures...

Now — perfect sealing for pumps handling light hydrocarbons up to 600 lb. pressures. Can be installed on your present equipment — no special sleeves or machining required.



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KALAMAZOO

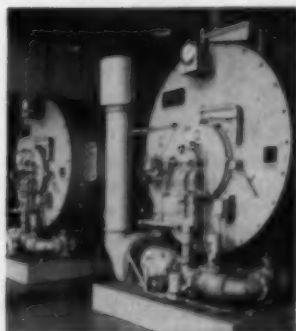
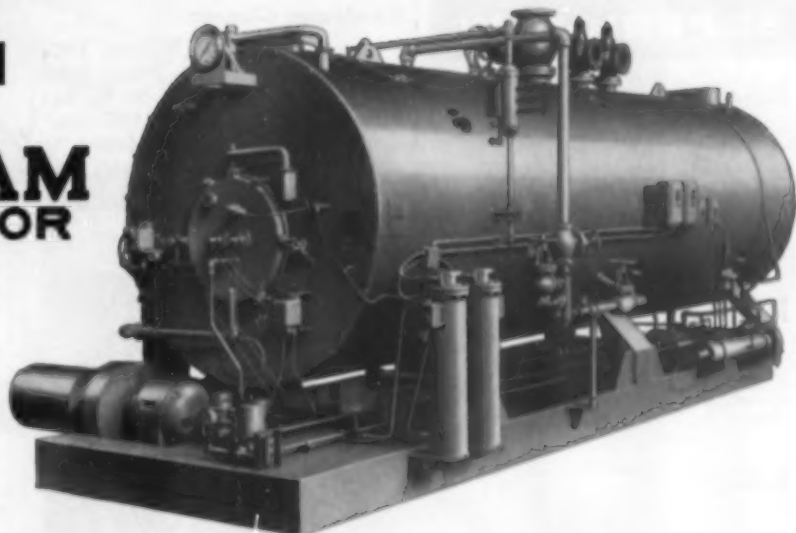
**CORPORATION**  
MICHIGAN

# GET **ALL** THESE ADVANTAGES

## WITH AN **AMESTEAM** GENERATOR

**For:  
PROCESSING  
HEAT — POWER**

20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas or oil-gas combinations with quick fuel switchover feature.



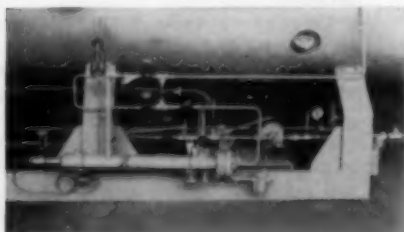
### FULLY ASSEMBLED

All piping, wiring and operating parts completely assembled and tested at factory — units shipped in ready-to-fire condition!



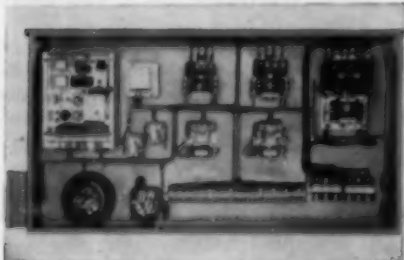
### EASY TO CLEAN

Ames-designed davit hinged flue covers and baffle provide quick and complete access to the furnace and all tubes.



### AMPLE ROOM

underneath for servicing auxiliary equipment. Control panel at eye level.



### AUTOMATIC

operation, fully safeguarded, is provided by factory installed and tested control system.

### SAVINGS IN FIRST COST!

Your purchase price includes complete unit — no hidden "extras" to buy later on!

### SAVINGS AT INSTALLATIONS

Just set on level concrete floor, connect to service lines and breeching. Nothing to assemble. No brick work required.

### SAVINGS IN OPERATION

A minimum of supervision — lower manhour requirements for maintenance — easily replaced inexpensive plastic refractories — 80% thermal efficiency.

Write for bulletin today!

**AMES IRON WORKS, INC.**  
Oswego, N. Y., Box I-55

Gentlemen:

Please send me further information on AMESTEAM GENERATORS and name of nearest representative.

NAME .....

COMPANY .....

ADDRESS .....

**AMES IRON WORKS INC.**

BOX I-55

OSWEGO, N. Y.



## Here's The "Inside Story" of **PENBERTHY** GAGE VALVE SUPERIORITY

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Locknut

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Plate

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or Lever

Steel Stem  
Packing Nut

Stainless Steel  
Standard or  
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Stem

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• Unmatched quality and design mean top performance at lowest cost during long service. FLOATING SHANK alone saves 50% or more on installation costs. Order through local supplier or direct. Write for Catalog No. 35 showing complete line.

**PENBERTHY INJECTOR COMPANY**  
Division of the Buffalo-Eclipse Corporation  
1242 Holden Ave., Detroit 2, Michigan

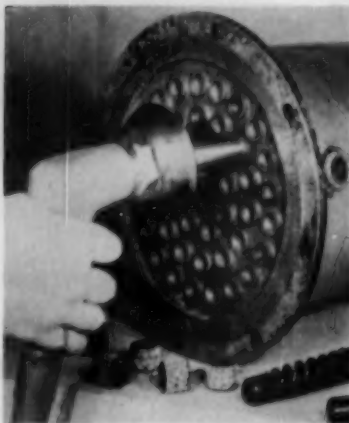


## new equipment (continued)

For more data circle item code number  
on the postage free post card — p. 17

### Condenser Cleaner

**E-17** THOMAS C. WILSON, INC.,  
21-11 44th Ave., Long  
Island City 1, N. Y., has  
placed on the market a "Blo-Gun"  
condenser cleaner as an addition to  
its line of condenser assembly and  
maintenance tools.



The air or water operated cleaner is useful for removing soft deposits, such as mud, algae, and similar accumulations from condensers in steam power plants and in the refrigeration, air conditioning and process industries. The gun makes use of the plug shooting or washing method.

Light weight, minimum number of parts, long wearing quality and rapid functioning are its principal design features. It weighs only two pounds and has an aluminum housing with a removable bronze nozzle and rubber spray shield.

The user may select either a corded-rubber plug or nylon spiral brush. Plug and brush projectiles are furnished with outside diameters in the range between 1/8 in. and 1 in. The plug's irregular surface gives it a brush effect. The brush itself is of stiff nylon terminating in a plug. Its ends are slightly less in diameter than the diameter of the tube, and water is thus free to flush ahead of the brush as it proceeds through the tube. Both plugs and brushes may be used repeatedly.

The plug or brush is first placed in the tube. The nozzle of the Blo-Gun is then inserted and by a continued forward movement, compressed air or water is released, propelling the accessory forward through the tube in less than a second.

### Corrosion Protection

**E-18** KOPPERS COMPANY, INC.,  
Tar Products Division,  
Pittsburgh 19, Pa., has de-  
veloped a new spray coating for metal  
equipment that combines protection  
from corrosion with a moderate de-  
gree of insulation.

Black in color, this new product is made of processed coal tar pitch mineral filler, solvent, and granulated cork. Requiring no primer, one application produces a protective covering up to one-half inch in thickness.

This new cork mastic was developed for use in locations where metal tanks containing heated materials require corrosion protection as well as insulation to prevent major heat losses. It may be used where massive insulation, installed at much greater cost, is not required.

Such combined protection is best suited for oil storage tanks, asphalt storage tanks, any metal tank whose contents are kept at temperatures up to 150 F, chemical plants or equipment, corrugated steel sidings, and heating and ventilating ducts. This product is sold under the trade name of Bitumastic "K".

### Metallic Putty

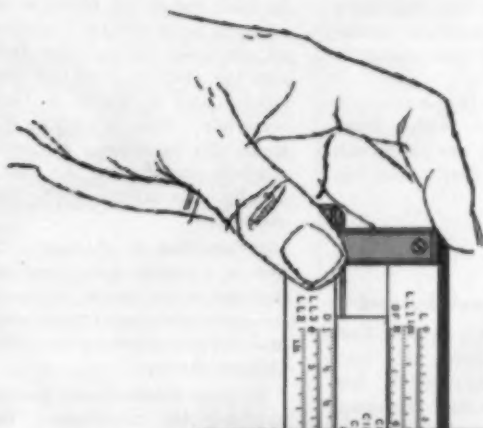
**E-19** SMOOTH-ON MFG. Co., 570  
Communipaw Ave., Jersey  
City 4, N. J., is producing a  
versatile aluminum putty, which  
shrinks less than 2/10 of 1% while  
hardening, and will not crack in thick  
applications, for building up metal  
surfaces or for caulking seams and  
holes in metal and wood surfaces.

Though easy to mix with its curing agent, the putty has the needed thixotropy for application with simple hand tools to vertical and overhead surfaces.

This new "Metalset A201" hardens to a metallic density at room temperature. Curing can be expedited with additional external heat. The product can be machined by any conventional method, and can be tapped or drilled. It is not affected by water and resists acids and alkalis. Adhesion is good. When machined, the color approaches that of cast aluminum.

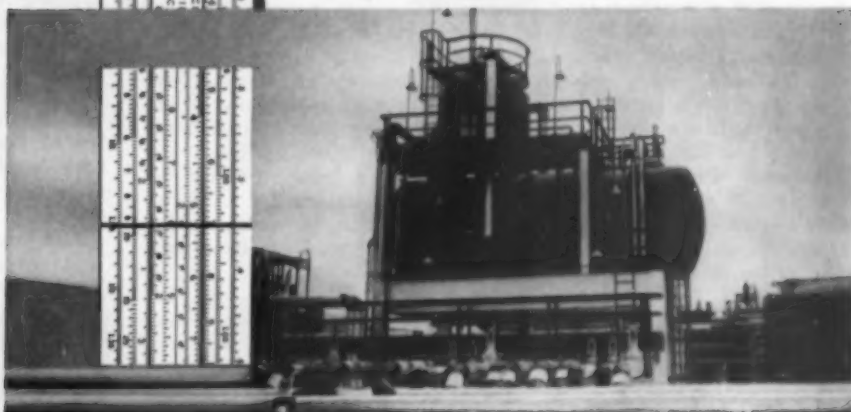
Metalset A201 is epoxy resin compounded with aluminum and other ingredients to form a paste. Filler materials are completely suspended. Since curing is the result of polymerization, there is no solvent to evaporate and cause shrinking or cracking. Its primary usefulness is therefore thick applications. Heat ceiling is 300 F.





**ENGINEERED  
FOR...**

**DEPENDABILITY**



**GRAVER**

**DEAERATING HEATERS**

**SPRAY, TRAY and  
SPRAY-TRAY...  
FOR THE POWER PLANT**

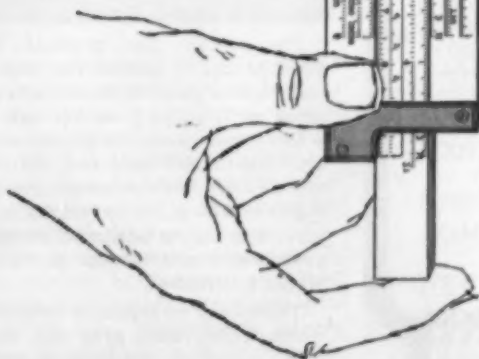
Write for: Articles T-114, T-115, T-117 and T-127  
Spray Heater Bulletin WC-101A  
Tray Heater Bulletin WC-106

*Industrial Department: I-112*

**GRAVER WATER CONDITIONING CO.**

*A Division of Graver Tank & Mfg. Co., Inc.*

**216 West 14th Street, New York 11, N. Y.**



## new equipment (continued)

For more data circle item code number  
on the postage free post card — p. 17

### Cement-Base Paint

**E-22** A. C. HORN DIVISION of SUN CHEMICAL CORPORATION, Long Island City, N. Y., has introduced "Waterfoil," a new ready-mixed cement-base paint designed to prevent water seepage.

Waterfoil may be applied to a wet or dry wall without the need to saturate the surface with water before and after application. It is effective for preventing the leakage of water through masonry or cinder block walls.

The addition of a combination of self-hydrating agents renders Waterfoil self-curing. Through chemical interaction it expands within surface voids into a cementitious coating that cures into a stone-like water barrier which permits breathing of the underlying masonry which does not allow the passage of water.

Waterfoil can withstand hydrostatic pressure of 500 lb/sq ft. It can be applied with an ordinary white

wash brush and dries within eight to ten hours. It can be used to keep basements and elevator pits dry, and by maintenance and utility engineers to protect furnaces, electrical equipment and warehouses from exposure to water.

The product, which is non-toxic, is available in five colors: white, gray, green, rose and buff. A one-gallon can costs \$2.39 while the four-gallon can is priced at \$7.59.

### Feedwater Treatment System

**E-23** NATIONAL ALUMINATE CORPORATION, 6226 W. 66th Place, Chicago 38, Ill., has

announced a new water treatment system using four formulas for conditioning feedwater for boilers ranging up to about 300 psi. Depending on an analysis of the feedwater, one of the four formulas is selected and will provide complete treatment for prevention of scale, corrosion and foaming in the boiler. Only in the most unusual cases will it be necessary to apply supplementary treatment along with the Nalco 400 System formula selected.

Each formula is produced in ball briquettes about 3 in. in diameter and weighing approximately one pound. At least one of the formulas contains as many as 10 different chemicals . . . all combined during manufacture to save the user the time and trouble of mixing and weighing a variety of materials. Ball briquettes eliminate waste due to spilling of liquids and powders, and control the dust hazard usually associated with powdered chemicals.

In addition to chemicals, the system is complete with chemical feeding equipment, testing apparatus and the consultation and recommendations of a Nalco representative without additional charge.

By-pass feeders are provided for applying the treatment. Ball briquettes are placed in the feeder and part of the feedwater is piped into the feeder to dissolve the chemicals and carry the solution back into the main feedwater line. A single calibrated needle valve adjustment controls dissolving rate.

Control procedure for determining treatment dosage and blowdown requirements has been simplified to the point where only three rapid tests are required. Test equipment and what brief instruction of operators is needed are part of the system.

### Resin Protective Coating

**E-24** PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7, Pa., has introduced a new resin coating for industrial corrosion protection.

Used with special Pennsalt high bond strength primers to ensure adhesion, the "Thick-Coat" system provides a durable protective coating for new or corroded metal, concrete and wood equipment and structures or surfaces exposed to fumes, corrosive chemical laden atmospheres or spillage of corrosive chemicals of acid, alkaline or neutral nature.

The product has excellent flow qualities and is applied like regular maintenance paint by brush, roller or spray as it comes from the can. In a three coat system—1 primer and 2 top coats—it will build to a minimum of 6 mils dry film thickness. Containing over 80% solids by weight, it assures long lasting protection on edges, prominences and crevices as well as on plain surfaces.

Thick-Coat is regularly offered in white, green, slate gray and black. Other colors are available on special order.

## EXTRA YEARS

OF MORE DEPENDABLE POWER  
and at less cost per pound of steam

## TODD BURNERS

GAS OR OIL

PRODUCTS DIVISION

## TODD SHIPYARDS CORPORATION

HEADQUARTERS: Columbia & Halleck Streets, Brooklyn 31, N. Y.

PLANT: Green's Bayou, Houston 15, Texas

TODD

### Floor Maintenance Material

**E-25** FLEXROCK COMPANY, 3645 Filbert St., Philadelphia 1, Pa., is now offering "Vyniflex," a new floor patching and resurfacing material designed for floors subject to acids, alkalies, salts, oils, fats, grease, water, slip-hazards, trucking or abrasion.

The product will take any traffic the sub-floor can. It is shock-proof, non-inflammable, warm and quiet to the feet.

Any handy-man can install this material—inside or outside on concrete, wood, asphalt, metal, brick or composition, and overlays can be made at only  $\frac{1}{8}$  of an inch. It is ready for use in 18 to 24 hours. Four colors plus natural are available.

### Aluminized Fabric for Protective Garments

**E-26** MINNESOTA MINING AND MANUFACTURING Co., 900 Fauquier St., St. Paul, Minn., is now manufacturing an aluminum coated fabric for use in protective garments for industrial "hot jobs."



A thin aluminum coating is applied on a light asbestos fabric base, to protect the wearer by reflecting radiant heat instead of insulating against it. The new material is flexible and is said to weigh about half as much as other protective fabrics, giving the wearer more freedom to work.

The manufacturer recommends it for workers in foundries and steel plants, fire fighters, and others who work in close proximity to intense heat. It allows them to work in the heat for longer periods of time.

## How do YOU cut BOLTS?



When you get to  $\frac{1}{4}$  inch and larger — do you cut the hard way or the easy way? This book compares the cost of hand tool metal cutting both ways—cutting

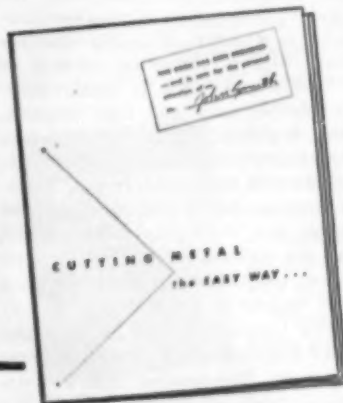
$\frac{3}{4}$ " bolts — hard or soft

$\frac{3}{4}$ " chain

$\frac{5}{8}$ " rod

steel strapping, flat or round stock, insulated cable, wire rope, etc.

in the shop or out on the job with hand power. WRITE for this book today — it shows you how to save money.



**H. K. PORTER, INC.**  
Somerville 43, Mass.

Please send me my copy of  
"CUTTING METAL THE EASY WAY".

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

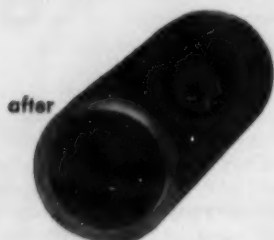
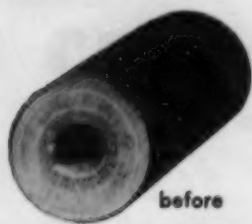
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# DISSOLVE SCALE



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### here's how

you can get complete details about chemical circulation cleaning. Send for your FREE copy of booklet 4305. This handy 28-page guide is packed with valuable information on how to remove rust and scale from heat exchangers, evaporators, air compressor tubes, and other types of equipment where rust and scale accumulate. Write Oakite Products, Inc., 23 Rector Street, New York 6, N. Y.



Technical Service Representatives in  
Principal Cities of U. S. and Canada

## new equipment (continued)

For more data circle item code number  
on the postage free post card — p. 17

### Thread Compound

**E-27** FELT PRODUCTS MFG. CO., 1561 Carroll Ave., Chicago 7, Ill., announces the development of Fel-Pro C-5 "Hi-Temp" thread compound for stainless steel and high temperature applications up to 1800 F.

Fel-Pro C-5 is now being widely used to prevent galling and seizing of studs, bolts and threaded assemblies, and as a preventive for galvanic pitting of stainless steel.

It is formulated on a special colloidal-copper base in a non-volatile and viscous carrier.

The use of C-5 in protecting threaded surfaces is said to greatly minimize shut-down or dismantling time, and prevent costly stud breakage. Another important aspect is the savings possible through repeated re-use of bolts, plugs and studs.

### Stainless Steel Fittings

**E-28** WATSON-STILLMAN FITTINGS DIVISION, H. K. PORTER COMPANY, INC., 342 Madison Ave., New York 17, N. Y., is now manufacturing 150 lb stainless steel pipe fittings, which are ideal for standard pressure services where corrosion is a factor. Type 304 Stainless Steel, with a chromium content of 18% and nickel 8% is highly resistant to corrosion and high temperature oxidation. Type 316 Stainless Steel has a chromium content of 18%, nickel 11% and molybdenum 2½%. Properties are similar to Type 304 except that the higher nickel content and the addition of molybdenum increase the corrosion resistance in a wide variety of services.

The lightweight 150 lb Stainless Steel Fittings are available in sizes ¼" to 2". The smaller sizes are machined from solid forgings. Larger sizes are manufactured from high quality stainless steel castings.

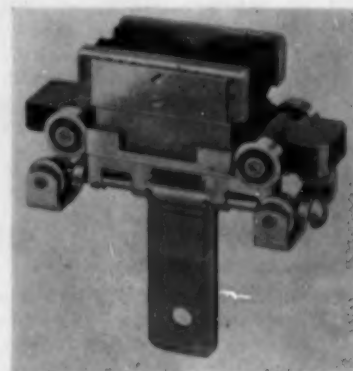
The screw-end fittings feature perfectly aligned, accurately cut threads and smooth bores. The socket-welding fittings provide tight, trouble-free joints and are easy to install. The sockets support and align the pipe for welding.

The new fittings are expected to find wide application in chemical plants, refrigeration, food and other

process industries, as well as in general industrial and laboratory applications.

### Trolley Cleaning Tools

**E-29** FEEDRAIL CORPORATION, 125 Barclay St., New York 7, N. Y., has developed trolley mounted cleaning tools to aid the maintenance man in his servicing of the company's trolley busway electrification systems.



The tools are designed to remove floating particles such as lint, dust, paint, spray, and other foreign matter that may cause electrical leakages, arcing and subsequent pitting of contact surfaces, or other conditions leading to necessity; of parts replacement or plant shutdown while repairs are made.

Two types of cleaning tools are offered for use with Feedrail systems commonly found in manufacturing plants. The dust remover employs stiff durable bristle brushes for removing lint and dust from bus bars. The bus bar cleaner has abrasive cleaning stones to remove any pita or are marks, at the same time polishing the bus bars.

These tools are inserted through the door track section, with the power off, and simply pulled back and forth along the length of a track run. Frequency of use will depend upon severity of accumulated foreign matter.

### Rust-Inhibitive Pigment

**E-30** REYNOLDS METALS Co., 2500 S. Third St., Louisville, Ky., has developed a new rust-inhibitive aluminum pigment in the form of a paste made up of strontium chromate and powdered aluminum.

As is well known, aluminum pigment offers amazingly effective hiding power, reflectivity, and protection to underlying material. However, it has no rust-inhibitive properties. Strontium chromate, on the other hand,



possesses outstanding rust-inhibitive properties, especially where salt water exposure is involved.

The new pigment efficiently combines the good characteristics of both pigments. Thus in a single coat, a paint made with this product provides the benefits of a rust-inhibitive primer and a reflective aluminum top-coat finish. While this single coat is not as good as a coat of primer followed by a coat of aluminum, it is much better than a single coat of either the primer or the aluminum itself.

### Stair Climbing Truck

**E-31** VALLEY CRAFT PRODUCTS, INC., 750 Jefferson Ave., Lake City, Minn., has announced production of a new stair climbing hand truck designated STAIR CART, and equipped with a special ratchet mechanism which enables it to roll up stairs step by step as the operator pulls a cable drive.



The two-wheel safety brakes incorporated in the truck prevent accidents when descending ramps or stairs with heavy loads.

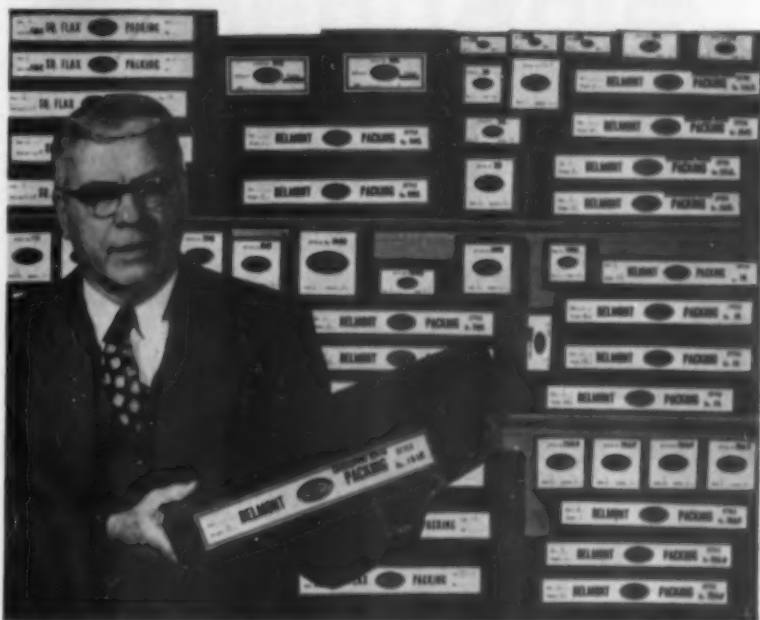
The STAIR CART is especially practical for handling such materials as welding tanks, barrels, drums, castings, hardware, machinery and related items.

Features such as interchangeable shoes, sealed ball bearings and steel tube construction assure load flexibility and a long efficient life.

The truck is equipped with large pneumatic tires which add to ease of operation and eliminate any marking of steps. Six different models are available for handling various sizes of loads, including a special barrel cart and a complete welding cart.



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# WHAT'S NEW and Where to Get It

FOR FREE INFORMATION—Circle code number on page 17 or 18

**Q-1 FIELD SERVICING OF BELTING**  
—Form NY-3305, 21 pages—Instructions for splicing transmission and conveyor belts and for making belt repairs on the job are given. Covers necessary equipment; vulcanized conveyor belt splice; conveyor belt repairs with and without vulcanizer; and vulcanized transmission belt splice.—NEW YORK BELTING AND PACKING COMPANY, 1 Market St., Passaic, N. J.

**Q-2 CONDUIT FOR UNDERGROUND PIPING**—Bulletin 10154, 9 pages—Covers all of the essentials of underground piping conduit. Shows how Therm-O-Tile is constructed and installed; how piping is supported, anchored, and guided. Shows many arch diameters and base sizes for almost any pipe combination. Illustrated with drawings, photographs, and cut-away views.—PORTER-HAYDEN COMPANIES, 835 Frelinghuysen Ave., Newark 5, N. J.

**Q-3 ENGINE AND COMPRESSOR MAINTENANCE**—Field Report No. 149, 1 page—Brief and to-the-point field report highlights excerpts from an article, "New Methods for Engine and Compressor Maintenance," a "how-to" discussion on lubrication of engines and compressors.—THE ALPHA CORPORATION, 65 Harvard Ave., Stamford, Conn.

**Q-4 LOW MAINTENANCE PUMPS**—Bulletin No. 1010, 16 pages—Given data on seal-less, leakproof Chempump centrifugal pumps available in sizes from  $\frac{1}{8}$  to 7  $\frac{1}{2}$  hp, to give low maintenance pumping at heads to 195 ft, capacities to 250 gpm.—CHEMPUMP CORPORATION, 1260 E. Mermaid Lane, Philadelphia 15, Pa.

**Q-5 FLEXIBLE CORDS AND PORTABLE CABLES**—Bulletin H-451, 54 pages—Complete up-to-date manual on flexible cords and portable cables for use with all types of portable equipment. Gives descriptions, characteristics, and dimensions for complete Hazarcord line featuring metal mold cure, ranging from light duty cord to 15,000 volt shielded shovel cable. Illustrated.—THE OKONITE COMPANY, Passaic, N. J.

**Q-6 OIL AND GASOLINE CONTAINERS**—Catalog No. 55—Illustrates and describes entire line of oilers, safety cans, and oil and gasoline containers available for industrial plants and other users.—EAGLE MANUFACTURING CO., Dept. 55, 2552 Charles St., Wellsburg, W. Va.

**Q-7 V-DRIVE SELECTIONS**—Engineering Guide No. 50-B—Tells how to make V-drive selections quickly and accurately, using new horsepower rating and

improved rating techniques. Simplified formulas for standard quarter-turn and V-flat drives are augmented by tables of drives in all belt sections.—FORT WORTH STEEL & MACHINERY COMPANY, P. O. Box 1038, Fort Worth, Texas.

**Q-8 VALVE MAINTENANCE MANUAL**  
—Manual DB-E27, 22 pages—Guide for maintenance of Edward pressure-seal, joint construction, valves. Suggests methods for determining source of trouble that might develop, and gives directions for disassembly, repair and reassembly of various types of valves when maintenance is necessary. Illustrated.—EDWARD VALVES, INC., East Chicago, Ind.

**Q-9 METAL REMOVAL**—Case History Booklet—Detailed on-the-job reports on use of Arcair cutting and gouging torch. Explains unique process of metal removal, using only an electric arc and compressed air. Illustrated with applicational photographs.—ARCAIR COMPANY, P. O. Box 337, Lancaster, Ohio.

**Q-10 CONCRETE FLOOR REPAIR**—Folder MP 275/454, 6 pages—Describes "Stopach," a new development designed for durable patches or complete overlays on floors where acid, grease and oil conditions have pitted and destroyed concrete surfaces. Plant photographs show specific applications.—STONHARD COMPANY, 1206 Spring Garden St., Philadelphia 23, Pa.

**Q-11 FURNACE MAINTENANCE**—Bulletin, 7 pages—"Handy Data for Users of Ironton Refractories" includes tables on standard series brick, cupola blocks, wedge, key, arch, and circle brick used to build, repair, or reline furnaces. Gives all information needed to estimate quantities of refractory brick required for construction or maintenance.—THE IRONTON FIRE BRICK COMPANY, Ironton, Ohio.

**Q-12 BEARING LUBRICATION**—Bulletin, 53 pages—Discusses ball and roller bearing lubrication. Chapters cover lubricant performance, oxidation resistance, water resistance of greases, bearing construction features, lubrication of anti-friction bearings, control of lubricant level, types of lubrication, application, charts, and other important material.—THE TEXAS COMPANY, 125 East 42nd St., New York 17, N. Y.

**Q-13 BRAZING MANUAL**—Catalog 925, 24 pages—Covers application of major brazing methods in joining metals using silver alloys and filler metals, fluxes, and gas atmospheres. Includes tables, drawings, and photographs. Discusses procedure, selection of brazing and filler metals, design of brazed joints, preparation, and other pertinent details.—AIR REDUCTION SALES COMPANY, 60 East 42nd St., New York 17, N. Y.

**Q-14 ELECTRICAL TEST INSTRUMENTS**—Data Sheets 1155-2155-2155—Cover safe, portable, high current test instruments for accurate testing and calibration of motor starter overload relays, meters, circuit breakers, induction disc relays and fuse links.—MULTI-AMP CORPORATION, 10 Third St., Newark 7, N. J.

**Q-15 WATER CONDITIONING**—Bulletin 6113, 20 pages—Covers seolite water softeners; ultra deionizers; boiler water conditioning; process water conditioning; filters and purifiers; degasifiers; water treating chemicals; water softener modernization; seolites of all types; illustrated with line drawings and photographs.—ELGIN REFIN-ITE, Elgin, Ill.

**Q-16 DRY-FILM LUBRICATION**—Bulletin 458, 4 pages—Describes "dag" colloidal dispersions or dry-film lubrication, effective over a wide range of operating conditions. Application is explained and illustrated, and properties of various types are covered.—ACHERON COLLOIDS COMPANY, Port Huron, Mich.

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**Q-17 PLANT SURVEY CHECK-LIST**—Pocket-Size Check-List — Prepared to assist plant management in determining condition of power distribution system. Arranged for step-by-step survey of incoming supply, power generation, primary distribution, secondary distribution, d-c power and lighting. — CONTINENTAL ELECTRIC EQUIPMENT COMPANY, Box 1655, Cincinnati 1, Ohio.

**Q-18 WELDING SUPPLIES**—Form ADC 845 36 pages—Covers complete line of arc welding and oxyacetylene welding supplies and accessories, including welding rods, fluxes, brazing alloys, goggles, helmets, shields, electrode holders, protective clothing, cable, clamps, hose, lighters, cylinder trucks, and carrying cases.—AIR REDUCTION SALES COMPANY, 60 East 42nd St., New York 17, N. Y.

**Q-19 DUST CONTROL** — Bulletin, 24 pages — Describes Dustube method of dust and fume control. Specific plant photographs show the equipment in use for carbon black, chemicals, asbestos, smelting, coal cleaning, flour milling, sewage disposal, storage batteries, wood-working, ceramics, and other installations.—AMERICAN WHEELABRATOR & EQUIPMENT CORPORATION, Mishawaka, Ind.

**Q-20 METALLIZING** — Bulletin 51B-25M/6-53, 8 pages—Discusses practical application of metallizing in fast, low-cost repair of worn or damaged machine parts and in long-term corrosion protective coatings. Illustrated with plant photographs.—METALLIZING ENGINEERING CO. INC., Westbury, Long Island, N. Y.

**Q-21 AIR-ACETYLENE GAS GUN** — Bulletin, 4 pages — Describes the Century Torch-o-Matic on-off air-acetylene gas gun, which provides trigger action for soldering, sweating, brazing, preheating, melting, and maintenance procedures. Illustrated with photographs.—VELOCITY-POWER TOOL COMPANY, 201 N. Braddock Ave., Pittsburgh 5, Pa.

**Q-22 PORTABLE ELECTRIC TOOLS**—1955 Standard Catalog, 24 pages—Lists standard line of electric tools, with photographs, specifications, prices, and full information for ordering.—THE BLACK & DECKER MFG. CO., Towson 4, Md.

**Q-23 ELECTRIC HEATING UNITS** — Catalog 50, 32 pages—"101 Ways to Apply Electric Heat" illustrates and describes approved methods of electrically heating liquids, air, gases, machine parts, and process equipment. Illustrated with drawings and photographs.—EDWIN J. WIEGAND COMPANY, 7500 Thomas Blvd., Pittsburgh 5, Pa.

**Q-24 FLOOR REPAIR**—Bulletin E-27, 2 pages—Describes seven simple steps for repairing worn or corroded mortar joints of brick or tile floors, with each step fully illustrated. Explains use of non-shrink Embecco pre-mixed mortar, ready to use for joints 1/4 inch and wider, or non-shrink Embecco No. 5, to be combined with portland cement for smaller joints.—THE MASTER BUILDERS COMPANY, 3015 Euclid Ave., Cleveland 3, Ohio.

**Q-25 HYDRAULIC FLOOR CRANES**—Catalog 505, 12 pages—Describes hand-powered hydraulic portable floor cranes, available in models capable of handling from 1000 to 8000 lb. and some models reaching as high as 13 1/2 ft. for application in relocation of equipment, disassembly and reassembly, handling heavy motors, armatures, or component parts.—RUGER EQUIPMENT, INC., 615 West 4th St., Uhrichville, Ohio.

For more data circle item code number on the postage free post card—p. 17

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Boiler Feed Pumps, like these four Warren Pumps shown at the new, ultra-modern North Grafton, Massachusetts, Heavy Press Forging plant of

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must always be available for round-the-clock operation—if and when necessary.



Photograph, courtesy Wyman Gordon Company. Other Warren Pumps in this plant include Condensate and Fuel Oil Transfer.

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## WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts



## Books for the Plant Engineer

### Brittle Behavior of Metals at Low Temperature

PUBLISHED BY AMERICAN SOCIETY FOR  
TESTING MATERIALS

1916 Race St., Philadelphia 3, Pa.

474 pages

Price, \$7.50

"Symposium on Effect of Temperature on the Brittle Behavior of Metals with Particular Reference to Low Temperatures", ASTM Special Technical Publication No. 158, is useful for designers, engineers, and metallurgists in practically all branches of engineering. It is of particular value to fabricators of chemical equipment to be operated at low temperatures; fabricators or operators of pipelines for transmission of natural gas; fabricators of large welded structures; and foundries producing castings for refrigerators and equipment operated at low temperatures.

### Steel Castings—Custom Made

By GEORGE K. DREHER

PUBLISHED BY STEEL FOUNDERS' SOCIETY OF AMERICA

920 Midland Bldg., Cleveland 15, Ohio

4 pages

No charge

This reprint of the article "Steel Castings—Custom Made", written by the secretary of the Steel Founders' Society of America, is available without charge to those interested in the purchase and use of castings. While the article is written on steel castings, the same fundamentals will prevail in the purchase of any casting regardless of the material from which cast. It is not intended to sell any particular product, but is useful as a buyer's guide.

### Storage Batteries

By GEORGE WOOD VINAL

PUBLISHED BY JOHN WILEY & SONS, INC.

440 Fourth Ave., New York 16, N.Y.

446 pages

Price, \$10.00

This fourth edition is a general

treatise on the physics and chemistry of secondary batteries and their engineering applications. It has been largely rewritten to bring the reader up to date on this rapidly developing industry.

New information includes: improved lead alloys to withstand corrosion; increased use of lead calcium alloys; increased use of uncalcined high-metallic oxides; intensive studies of expanders; many new types of separators; plastic containers; nickel-cadmium batteries; new types of silver oxide cells; and many other important topics.

### Glass Reinforced Plastics

EDITED BY PHILLIP MORGAN, M.A.

PUBLISHED BY PHILOSOPHICAL LIBRARY

15 East 40th St., New York 16, N.Y.

248 pages

Price, \$10.00

This volume is an attempt to cover facts on glass reinforced plastics for the general reader, with organic chemistry, design, moulding processes, and major applications explained in sufficient detail for the specialist. The chief resins used for bonding glass fibers are polyesters, phenolic, epoxide, silicone, melamine and furnace resins, and their use with glass is described. The many ancillary materials, especially for use with polyesters, and the various forms of glass reinforcements are also covered.

### Magnetic Control of Industrial Motors

By GERHART W. HEUMANN

PUBLISHED BY JOHN WILEY & SONS, INC.

440 Fourth Ave., New York 16, N.Y.

714 pages

Price, \$9.50

This second edition presents the underlying principles of motor performance, controller and circuit design, and controller application. Material has been brought completely up to date, and expanded to include new information on adjustable voltage and regulating systems, particularly with regard to rotating and magnetic amplifiers. Emphasis has been placed on theoretical background underlying recognized National Standards and Safety Codes.

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Engineers like the way Albany Pressuregrease Universal clings to metal at all temperatures. Its high resistance to moisture prevents rust. Assures cleaner floors because it will not run off at high temperatures or high speeds. Ask for it at your mill supply house.

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J. H. MENGE CO., 932 Nat'l Bank of Commerce, New Orleans, La.

### Maintenance Supplies

(See page 104)



## News (continued)

(Starts page 10)

### Acme Steel Appoints New Southern Sales Manager

The appointment of G. R. EASLEY to Southern area sales manager has been announced by ACME STEEL PRODUCTS DIVISION of ACME STEEL COMPANY, Chicago. Mr. Easley will have headquarters in EAST POINT, GEORGIA, a suburb of Atlanta.



G. R. Easley

Also announced were the appointments of R. C. CAMP to district sales manager of the VIRGINIA-CAROLINA district in Greenville, North Carolina, succeeding Mr. Easley, and J. R. LEMASTER to district sales manager of the mid-south district in NEW ORLEANS, LOUISIANA.

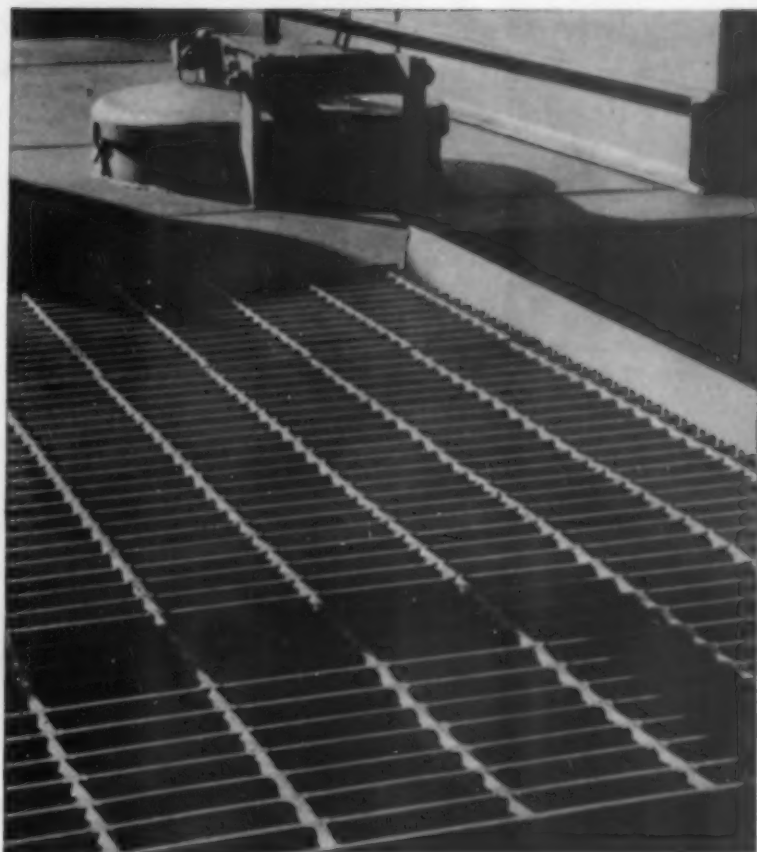
Mr. Easley, who joined Acme Steel in 1934, served as a salesman until his appointment as Virginia-Carolina district sales manager in 1950.

Mr. Camp came to Acme Steel eight years ago after serving in sales positions with Camp and Eason, Inc., and the Homelite Corp., Atlanta. He has been a salesman, special representative for the southern area, and southeastern district sales manager.

Mr. LeMaster joined Acme Steel Company in 1947 as a sales correspondent. After serving as a salesman in the Kansas City and mid-south district, he was appointed special representative in 1954.

### Avisco Promotes Dungan to Plant Manager at Roanoke

W. EDWARDS DUNGAN has been promoted to plant manager at AMERICAN VISCOSSE CORPORATION'S ROANOKE, VA., rayon plant. Mr. Dungan was chief plant engineer until his promotion and will be succeeded in



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Indoors or outdoors, you can provide safe walking conditions throughout your plant on floors, stair treads, platforms, walkways and catwalks. For Blaw-Knox Electroforged Steel Grating brings you these exclusive features:

1. rigid one-piece construction—easy to install
2. non-slip twisted crossbar—for safe footing
3. three types of bearing bars
  - square bars—for smoothest walking surface
  - knurled bars (Furro-Grip)—for extra safety plus relatively smooth walking surface
  - serrated bars—for maximum safety under extremely hazardous skid conditions
4. no sharp corners to clog—self-cleaning
5. all surfaces accessible—easy to paint
6. maximum open area—for light and ventilation



Write for your copy of new Bulletin No. 2486  
—or send dimensional sketch for quotation.



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BLAW-KNOX EQUIPMENT DIVISION

Pittsburgh 38, Pennsylvania

GRATING APPLICATIONS: floors • platforms • walkways • catwalks • stair treads • fan guards • shelving • and many other uses, both outdoors and indoors, for versatile steel grating

# No Maintenance Costs Reported In 5 Years

*The Speed-Trol on a 90-foot Wagner Lithograph Drying Oven provides the infinite speed adjustment and positive control of speed required for accurate regulation of drying time. This drive, in operation 16 hours per day, five days per week, since 1947, has given trouble-free service, and a recent inspection discloses no worn parts, reports E. E. Roney, Plant Manager, Bond, Crown & Cork Co., New Orleans.*

## STERLING SPEED-TROL



## GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

**Equipment adaptation to:** Sequence synchronization — operators' abilities — load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

**Process control of:** Temperature — viscosity — level — pressure — flow — etc.

**Time control of:** Baking — drying — heating — cooking — pasteurizing — soaking — chemical action — etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality & profit.

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Kload and Kload-Tite Electric  
Power Drives. Write for catalog  
No. 209.

# STERLING

ELECTRIC MOTORS

Plants: New York City 51; Chicago 35; Los Angeles 22;  
Hamilton, Canada; Santiago, Chile  
Offices and distributors in all principal cities

## News for the South and Southwest (continued)

that post by WILLIAM H. KREAMER, formerly assistant chief plant manager.

Mr. Dungan was graduated from Virginia Polytechnic Institute with a B.S. degree in electrical engineering. Prior to joining Avisco in 1940 as

chief design engineer for the Corporation Engineering Department in Philadelphia, he was with General Electric for twelve years. He went to Roanoke in 1951 as assistant chief plant engineer and was made chief plant engineer in 1952.



## 21-in. O.D. Pipe Bent 90-Deg. in St. Louis Plant

ONE OF the heaviest pipe-bending jobs ever handled was recently completed at the St. Louis headquarters plant of MIDWEST PIPING COMPANY, INC., where giant alloy steel tubing of 3½-in. wall thickness and 21-in. outside diameter was bent and formed to comprise the main steam lines for two of the largest boiler and turbine units ever built. The work is for the new River Rouge Station of the Detroit Edison Company.

Ultimately the station is to consist of six units. The two now under construction are of 260,000 kw capacity each. Boiler capacity per unit is to be 1,710,000 lb/hr produced at 2050 psi and 1050 F.

Steam piping for the installations is chrome and molybdenum steel alloy of unusually large diameter and wall thickness. To make bends of up to 90 degrees in tubing of this composition and weight—and to weld units of the tubing into appropriate lengths and shapes was the job for which Midwest Piping was selected by the Detroit utility.

### Tube Bending Technique

Before it is bent, the tubing, which weighs 725 lb/ft, is filled and packed solidly with sand. A 25½-ft length, filled with sand, has a total weight of

about 11 tons. The sand-filled length is heated in the area to be bent to a temperature of about 1750 F and must be held to within 200 degrees of this temperature during the bending operations. At the moment the tubing is ready for bending, as determined by continuous temperature tests, the length is lifted by cranes out of the gas heating furnace and is set down on a heavy steel bending table.

On this table is a form—called the bending shoe—against which the length of tubing is pulled by a cable attached to one end as the other end is held stationary. To increase the leverage, a metal sleeve is placed on the end that is to be pulled. With everything in readiness, it is a matter of five or six minutes for the tubing to be pulled to the required angle by a capstan. During the bending process the temperature of the tubing is constantly taken. A bend cannot be made if the temperature falls below 1500 degrees.

Midwest Piping, which is one of the nation's leading fabricators and erectors of industrial and power piping systems, operates plants in Boston, Passaic, N. J., and Los Angeles in addition to its headquarters in St. Louis.

#### American MonoRail—Ala.

THE AMERICAN MONORAIL CO., 13107 Athens Ave., Cleveland 7, Ohio has announced the appointment of the NEWELL EQUIPMENT CO., P.O. Box 3264, BIRMINGHAM, ALABAMA, as distributor for the State of Alabama. The company is headed by C. P. NEWELL, who was formerly sales engineer in American MonoRail's Atlanta district office.

#### Nuclear Reactor Plant for Chattanooga, Tenn.

New plant facilities for the manufacture of nuclear power equipment will be the major part of a long-term expansion program of COMBUSTION ENGINEERING, INC., with an initial appropriation of \$7,000,000.

Ground has been broken for a new building to be located at the company's CHATTANOOGA, TENNESSEE, division that will have the most advanced manufacturing equipment available for the production of nuclear reactors. A specially designed wharf will also be built on the Tennessee River frontage of the Chattanooga plant so that very large component parts of nuclear installations can be transported by barge. The program will be completed within a year.

The new facilities will place Combustion Engineering, Inc., in a position to design and build complete nuclear power plants up to the turbine. Among other important work in process is the huge reactor vessel for the power station to be built for the Duquesne Light Company near Pittsburgh which will be the first commercial-size nuclear power plant in the country.

The new building at Chattanooga will be equipped with heavy duty cranes, large boring mills and other machines capable of fabricating parts to the extremely close tolerances and fine surface finishes required. A particularly notable piece of equipment will be a 15,000,000-volt betatron, a machine capable of fast X-ray inspection of steel castings, forgings, plates and welded joints many inches thick. Certain areas of the building will be supplied with filtered air under pressure to maintain dust-free atmosphere.

The loading apparatus at the new wharf will be capable of handling reactor vessels weighing up to several hundred tons, since some of the vessels will be of such weight and proportions that they cannot be shipped by rail or trailer truck.

IF IT'S EXPOSED TO RUST—  
HAVE IT

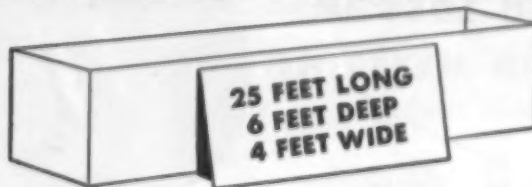
# HOT-DIP GALVANIZED

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Add years of useful life to iron or steel. Give your products new sales appeal. Genuine hot dip galvanizing will do it.

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FABRICATING DIVISION

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## News for the South and Southwest (continued)

### William E. Brice Heads Texas Apparatus Co.

The formation of a new Houston firm, TEXAS APPARATUS COMPANY, 2300 Congress Ave., was announced recently by WILLIAM E. BRICE, president. REX B. GREY is vice-president and works manager and JAMES J. BRICE is vice-president and secretary.

"My experience as a manufacturers' agent pointed up the need in the Southwest generally, and in Houston particularly, for a fabricating company with both engineering and production facilities," Mr. Brice stated. "Texas Apparatus Company combines engineering know-how and manufacturing facilities to provide services and products locally, which heretofore were obtainable only through the facilities of multiple companies located over a wide area.

"Texas Apparatus Company is set up," Mr. Brice added, "to manufacture products in three major divisions. One division is the electrical

industrial distribution apparatus and assemblies, switchboards, panel boards, load centers, motor control centers, power bus work, process control and instrumentation.

"The firm is especially well-equipped to engineer materials handling apparatus and equipment conveyors, elevators, bins, hoppers, spouting, and related process control assemblies for the chemical industry, rice mills, fertilizer, and cement plants, coffee plants and similar industry.

"Because of the great demand in the Southwest, we have established as an integral phase of our operations, the industrial iron work specialty steel fabrications, and medium structural assemblies for industrial and commercial construction," he said.

Prior to the opening of the new firm, Mr. Brice had for six years operated the William B. Brice Company, which served as manufacturers' representatives. Earlier he had been associated with Wilson Electrical Equipment, Houston Lighting and Power

Company and in the General Electric Company's test training program for engineers.

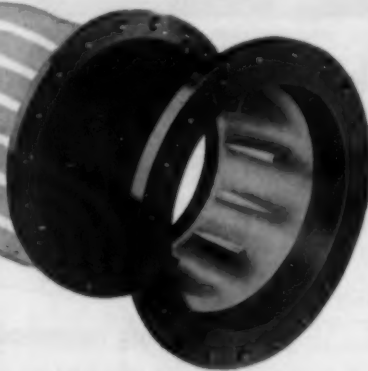
Mr. Grey was formerly manager of manufacturing for the Trumbull Department of General Electric Company and in charge of seven branch plants. He later was assigned to the manufacturing service division of General Electric at Schenectady, New York, with duties related to selection of new plant sites, new products, management organization, manufacturing methods and control. In 1947, Mr. Grey established the GE Trumbull Department plant in Houston for manufacturing industrial control apparatus. He was responsible for procurement and installation of machinery and tools, selection and training of employees, procedures and direction of sales.

James J. Brice, who serves the new firm as vice-president and secretary, has been associated with the William E. Brice Company in machinery and apparatus sales since 1949. He was previously West Texas district sales manager for Continental Grain Company.

Staff of the company also includes electrical, mechanical, welding and fabricating engineers. Associated with the company in sales and engineering are Gene Brice, Russell Repman, Harold Leavitt, and Ernest Warrington.

## FOR LOWEST HEAD LOSS IN FLUID METERING

← The *Gentile*<sup>®</sup>  
**FLOW TUBE**  
\* GEN-TIL-LY



**WHERE HEAD LOSS IS IMPORTANT...**The Gentile Flow Tube can be designed to produce a measurable differential with lowest permanent pressure loss of any head meter.

**ACCURACY...**Differential is produced from points of equal cross-sectional area. Furnished with head capacity curves, and guaranteed for exceptional accuracy when used with any standard indicating, recording or integrating meter.

**REVERSIBILITY...**When the flow is reversed, the differential is reversed. Permits metering reverse flow at lowest possible equipment cost.

**LOW INSTALLED COST...**Average length is only 1½ times the pipe diameter, and straight runs entering and following are not required unless installed near throttling valves or regulators.

Write for Bulletin FT-101 or specific recommendations.

### FOSTER ENGINEERING COMPANY

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UNION, N. J.

AUTOMATIC VALVES • SAFETY VALVES • FLOW TUBES

### ASTE Officers & Awards

Installation of new national officers and presentation of the Society's first honor awards featured the annual banquet of the 31,000 member AMERICAN SOCIETY OF TOOL ENGINEERS held recently in Los Angeles.

DR. HARRY B. OSBORN, JR., of Cleveland, Ohio, was elected president to succeed Joseph P. Crosby of Hudson, Mass. Dr. Osborn is technical director of the Tocco Division, Ohio Crankshaft Company. H. E. COLLINS, manager, process engineering department, Hughes Tool Company, HOUSTON, TEXAS, was elected second vice president; and W. G. EHRHARDT, managing partner, Ehrhardt Tool and Machine Company, ST. LOUIS, MISSOURI, was among those re-elected to the board of directors.

Ernest R. Breech, chairman of the board of Ford Motor Company, received the 1955 ASTE Progress Award. Philip M. McKenna, president of Kennametal, Inc., Latrobe, Pa., received the ASTE engineering citation.



### American Welding Society to Meet in Kansas City

Papers on many current, practical problems of welding, as well as those on advanced research, will highlight the program of the National Spring Meeting of the AMERICAN WELDING SOCIETY, scheduled for the Hotel Muehlebach, Kansas City, Mo., June 7 to 10.

The meeting is held in conjunction with the annual Welding Show, which will be presented at the Municipal Auditorium in the same city, June 8-10.

Thirty-nine papers will be presented at the meeting. Among those expected to attract particular interest because of their present concern to manufacturers of many types of products will be discussions of the use of quenched and tempered steel for welded pressure vessels, the use of iron powder coated electrodes, and the uses of carbon dioxide as a shielding gas in gas-shielded metal arc welding.

Two of the outstanding research sessions will be on "Weldability and Research," and a third will present a symposium on the coordination of the society's standards and specifications. Sessions on welding for aircraft and for machine and building structures are expected to attract considerable interest.

### Burgess-Manning and Penn Industrial Instrument Merge

A merger was recently formed whereby PENN INDUSTRIAL INSTRUMENT CORPORATION of Philadelphia became a division of BURGESS-MANNING COMPANY of Libertyville, Ill., Chicago, and DALLAS, TEXAS.

Burgess-Manning manufactures industrial silencing equipment and architectural acoustical products. The Penn division will continue to manufacture industrial instruments, including a full line of flow meters.

### Royston Laboratories Opens New Atlanta Office

ROYSTON LABORATORIES, INC., Blawnox (Pittsburgh), Pa., announces the appointment of E. M. STEINMANN as Southeast sales engineer in charge of the new Atlanta office. Royston Laboratories' complete line of protective coatings will be sold through the new office and warehoused in Atlanta. The address is P. O. Box 1084, N. Decatur Station, Atlanta, Ga.



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**SubALOX** is a complete paint system, so easy and economical to use that a single coat gives an excellent and lasting job. Can be applied by customary methods, but for most satisfactory application we recommend floor brooms.

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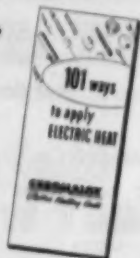
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Charlotte 2, N. C.

## News for the South and Southwest (continued)

### Tube Turns Plastics—Ky.

TUBE TURNS PLASTICS, INC., LOUISVILLE, KY., has announced the addition of EARL ERICH to the company's technical service staff.

Erich, a specialist in solving industrial corrosion problems, began his

career as a research chemist for The Atlas Mineral Products Company, and later organized and headed the company's Thermoplastics Division.

Tube Turns Plastics, Inc., manufactures pipe fittings and custom molded products of unplasticized polyvinyl chloride.



Left to right, Robert E. Harper, president, NBP; Vice-President Richard M. Nixon; Former President Herbert Hoover, recipient of the 1954 NBP Silver Quill Award; and Harvey Conover, chairman of the board of NBP, and master of ceremonies of the NBP Silver Quill Award Dinner.

### Silver Quill Goes to Hoover

Former President HERBERT HOOVER was the recipient recently of the highest tribute of the business press, the 1954 SILVER QUILL Award of NATIONAL BUSINESS PUBLICATIONS, INC.

The presentation of the award was made by Vice-President Richard M. Nixon, the recipient of the 1953 Award. The award was made at the National Business Publications' Silver Quill Award Dinner, held in Washington, D. C., before a group of nearly 1,000 member-publishers and their guests representing nearly every branch of business and industry, as well as government.

Harvey Conover, president, Conover-Mast Publications, and chairman of the board of National Business Publications, served as master of ceremonies. In his introductory comment, he pointed out that "sound business decisions are essential to the continuing prosperity of our enlightened economy.

"Business magazines are dedicated to the enduring service of providing the knowledge that is necessary for those sound decisions. That is why we seek each year to present our Silver Quill Award to that person

who has best epitomized those things for which we stand and in which we serve. The Silver Quill of NBP, like the organization that awards it, is synonymous with consecrated service to business and industry and to the government that guarantees our freedom of enterprise."

The 1954 Silver Quill Award to former President Hoover was made on the basis of his distinguished services to business and industry through the leadership he has provided in the planning, programming, and progress of the Commission on Organization of the Executive Branch of the Government.

An interesting feature of the award dinner was a series of three minute talks on various aspects of government and business by several Members of the Cabinet of the United States, heads of governmental departments, and nationally known industrialists and businessmen.

SOUTHERN POWER AND INDUSTRY, as well as the other six magazines published by W. R. C. Smith Publishing Co., is a member of National Business Publications. William J. Rooke, chairman of the board of W. R. C. Smith Publishing Co., is currently serving as vice-chairman of NBP.



Henry Crown, industrialist, chairman, president and director in mining, construction, railroad and management fields, sole owner of New York's Empire State Building, which attracts more than a million visitors annually to the observatories on this 1472-foot high building.



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decisions in the businesses, industries, sciences and professions...pin-pointing your audience in the market of your choice. Write for list of NBP publications and the latest "Here's How" booklet, "How Well Will We Have to Sell Tomorrow?", by Ralston B. Reid, Advertising & Sales Promotion Manager, Apparatus Sales Division, General Electric Company, Schenectady, N.Y.



# "I multiply my eyes and ears when I read Business Publications"

says

Col. Henry Crown,  
President, Empire State Building Corporation

"I can't possibly know everything about every industry in which I am vitally interested," Col. Crown continues, "but through business publications I keep in touch with the important developments in construction, transportation, mining and the operation of hotels and office buildings. My associates, too, make constant use of the business periodicals covering their special fields."

Top management reads business publications because the writers and editors of those periodicals deliver pertinent and specific news coverage. That's why business magazines provide an ideal sales channel for any product or service of sound benefit to business or professional men.



## News for the South and Southwest (continued)

### World's Largest Aluminum Reduction Cell

The largest reduction cell ever operated in a commercial line producing aluminum is used in the two reduction plants recently built by REYNOLDS METALS COMPANY to meet the increased demands for primary aluminum, according to an announcement by J. Louis Reynolds, vice-president in charge of operations. These two facilities are the SAN PATRICIO PLANT, near CORPUS CHRISTI, TEXAS, with a rated capacity of 160,000,000 lb of aluminum per year, and the ROBERT P. PATTERSON PLANT at ARKADDELPHIA, ARKANSAS, with a capacity of 110,000,000 lb yearly.

Experimental development on this cell was nearing completion at the outbreak of the Korean War. It is from two to six times the size of other units now in use in this country. Each unit has a daily produc-

tion of approximately 2,000 lb of high grade aluminum. Each must be fed at a daily rate of 4,000 lb of alumina (aluminum oxide) and approximately 1,000 lb of carbon anode material.

#### How Cell Operates

This reduction cell is of the Soederberg type. It requires over 90,000 lb of steel in the fabrication of the shell and superstructure frame. The lower half of the cell makes up the cathode, and consists of a fabricated box approximately 12 ft wide, 38 ft long and 3 ft deep into which over 60,000 lb of carbon lining is rammed leaving a formed cavity 16 in. deep and somewhat smaller than the dimensions of the shell. In this cavity is held the molten aluminum as it is produced as well as the electrolyte material used in the process. As electrolyte temperature must exceed 1700 F, over 16,000 lb of alumina is used as insulation between the steel shell and carbon lining to prevent excessive heat loss. Imbedded into the carbon lining are approximately 130 steel bars two-and-a-half-inches in diameter and about 4 ft long. These are contacts for the large quantities of current required in the process.

Supported from insulated brackets on the cathode is a structural frame that supports the anode in the electrolytic material in the cavity of the cathode. The anode is a carbon block over 5 ft wide and nearly 33 ft long. The structural frame also carries the jacks and other mechanism required to adjust the level of the anode with respect to the cathode. The anode is lowered continuously as it is decomposed in the electrolytic process at the bottom and replenished from the top.

To form the positive electrical contact at the anode, approximately 70 contact pins 3 in. in diameter are imbedded in the carbon mass of the anode. Large quantities of electric power are required for the operation of this cell. Aluminum bus bars with cross sectional area of over 500 sq in. and capable of carrying over 125,000 amp are used to carry power to and from the cell. Each cell requires more than 30,000 lb of aluminum bus



Each of the huge new aluminum reduction cells in the Texas and Arkansas plants consumes 4000 lb of alumina daily. Here, the alumina is being fed into a cell from an overhead hopper carried by a crane.

and approximately 16,000 lb of copper bus for this purpose.

The cells are arranged for a series electrical circuit with the current flowing through the bus to the anode of the first cell, through the electrolyte and metal pad and on into the cathode. From the cathode it flows through the bus to the anode of the second cell and so on down the line.

Normally, the line consists of 160 cells with 80 cells in each of two parallel buildings. In the first, the power moves away from its source; in the second, it is returned to its source. Each building is made of steel frame with aluminum roofing and siding, is more than 1,800 ft long and covers over 2½ acres.

The power source of such a line must have a direct current capacity of approximately 100,000 kw, which is enough to supply a city of 300,000 population.

### Maintenance Supplies

(See page 104)

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### Riggan Joins Texas Steel

FRED B. RIGGAN, former vice-president in charge of research and development for the Key Company of East St. Louis, Illinois and consultant to the steel foundry industry, has joined TEXAS STEEL COMPANY of FORT WORTH, TEXAS, as chief metallurgist.

Riggan's background includes the following: chemist, National Cast Iron Pipe Company, Tarrant, Alabama; metallurgist, Stockham Valve & Fitting Company; vice-president in charge of research and development for the Key Company. During his association with Stockham, Riggan also was an instructor at Howard University.

### Pittsburgh Standard Conduit Appoints Southern Agents

Appointment of three new Southern sales agents has been announced by PITTSBURGH STANDARD CONDUIT COMPANY.

Representing the firm in the sale of rigid steel conduit, electrical metallic tubing, elbows, couplings and fittings, are: E. J. HAGAN, NEW ORLEANS, LA.; HOPPER & MCCOY, ATLANTA, GA.; and SOUTHLAND SALES AGENTS, MEMPHIS, TENN.

### A-C Forms New Industry Application Section

Formation of an industry application section headed by B. G. WITTY has been announced by the power department of ALLIS-CHALMERS general machinery division. T. B. MONTGOMERY is chief engineer of the section.

The section will have the responsibility of processing inquiries, handling commercial matters and application engineering of general machinery division products normally sold to industry as a related operating group of equipment, such as steel and brass mill drives.

Witty has been manager of Allis-Chalmers St. Louis district since 1950. He is succeeded at St. Louis by W. E. KORSAN, a representative in that office since 1945.

Montgomery has been chief engineer of Allis-Chalmers control engineering section since 1953. He came to Allis-Chalmers in 1925 and is an electrical engineering graduate of Georgia Tech.

Korsan joined Allis-Chalmers in 1942 and was a representative in the Memphis office before being assigned to St. Louis.



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## News for the South and Southwest (continued)

### B&W Tubular Products— St. Louis and Houston

TUBULAR PRODUCTS DIVISION OF THE BARCOCK & WILCOX COMPANY has announced that F. T. MURPHY, J. N. ROGERS and C. J. PONSOT have been named to handle sales of the division's products in the St. Louis area. They succeed Randolph Wohltman, who resigned January 1 after serving as the division's sales agent in the area for over 28 years. Mr. Murphy and Mr. Ponsot were associated with the St. Louis sales office of Globe Steel Tubes Co. Mr. Rogers has been associated with the Chicago sales office of B&W's Tubular Products Division. The new St. Louis sales headquarters are located in the Continental Building, 3615 Olive Street, St. Louis 8, Missouri.

The former HOUSTON sales office of Globe Steel Tubes Co. has been consolidated with B&W's Tubular Products Division sales office there. A. M. JOHNSON, who handled Globe sales

in the territory, has moved into the sales headquarters of B&W's Tubular Products Division at 2134 Welch Street, Houston 19. G. H. WEIGHT, Southwestern sales manager, is in charge of all Tubular Products Division sales activities in the area.

### Georgia Power Expansion

A \$32,000,000 construction program for 1955 which includes another 100,000-kilowatt steam-electric generating unit at Plant Yates, and preliminary exploration and design of the 48,000-kilowatt Clapp's Factory dam and hydroelectric plant at Columbus, has been announced by the GEORGIA POWER COMPANY. The amount to be spent for new construction in 1955 is approximately the same as was spent in 1954.

The sum of \$2,700,000 was authorized for the beginning of work at Plant Yates, which is located on the Chattahoochee River between Newnan and Carrollton. It will be completed in 1957. An allocation of \$100,000 for the preliminary work on the Clapp's Factory project was made.

The largest item in the budget for

generating plant construction will be the expenditure of more than \$3,000,000 to complete the third 100,000-kilowatt unit at Plant Hammond near Rome. The first two 100,000-kilowatt units were placed in operation there in 1954. Two hydroelectric units of 5,000 kilowatts each will be installed in the Goat Rock dam above Columbus. Total funds allocated for generating plant construction exceed \$7,500,000.

The company plans to construct 344 miles of new transmission lines with related substations, at a cost of more than \$8,700,000.

### L. F. Long Represents Glidden — Middle South

Appointment of L. F. LONG, Jr. as industrial sales representative of the Nubian Industrial Division of the GLIDDEN COMPANY has been announced.

In his new capacity, Mr. Long will be responsible for industrial paint sales in the "middle South." His previous positions with the Glidden Company included assignments as technical service director of the Central Industrial Division and as national project development coordinator at Glidden's headquarters in Cleveland.

Mr. Long, who was graduated from Case Institute of Technology with a degree in Chemical Engineering, will live in NASHVILLE, TENNESSEE.

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## Protective Services

WHILE plant protection features, such as guard service, are not normally thought of as means of improving operation or reducing plant costs, Southern Detectives, Inc., of Atlanta points out several instances where its guard service has resulted in more net profit.

One of the concerns using its guard service, a refrigerator manufacturing company, found that, after one year, it has saved over \$75,000 by decreasing inside larcenies. It also found that by following Southern Detectives recommendations for the control of fire hazards, they could save purchasing a quantity of new fire extinguishers, and at the same time

keep their insurance rate down to a minimum.

Another firm, engaged in producing defense material, saved many thousands of dollars in overtime and padded payrolls by having a guard stationed at the time clock.

A cabinet manufacturer, faced with demands by its truck drivers for retroactive overtime, in reviewing the daily log sheets kept by guards, found sufficient evidence that overtime pay was unjustifiable.

A particular advantage in using an outside agency is the complete separation of employee activities and the plant's security service. This eliminates collusion, and greatly limits opportunity for animosity between guards and workers.

### Westinghouse—Carolinas

OTIS O. RAE, vice president in charge of the WESTINGHOUSE ELECTRIC CORPORATION's southeastern region, has announced the creation of a new district within the region.

The new area has been named the Carolinas district and will include both North and South Carolina with headquarters in CHARLOTTE, N. C. The company's southeastern region includes, in addition to these two states, Georgia, Florida, Alabama, Louisiana, and major portions of Mississippi and Tennessee.

J. H. REEVES, JR. is manager of the new Carolina district. He comes to this post from that of manager of the Greenville, S. C. office.

A graduate of Alabama Polytechnic Institute, Mr. Reeves joined Westinghouse in 1925. He held numerous sales positions in the Birmingham, Charlotte, and Greenville offices before being named manager at Greenville in 1953.

C. Y. HOUSE, JR., succeeds Mr. Reeves as manager of the Greenville branch office. Mr. House was graduated from the Georgia Institute of Technology in 1930 and joined Westinghouse that year. He held various sales posts in the Atlanta office until his appointment in 1941 as sales engineer in the Charleston, S. C. office.

### New Union Carbide Plant in Operation, Seadrift, Tex.

The new polyethylene plant at SEADRIFT, TEXAS, has been put into full operation, it is announced by George C. Miller, President of BAKELITE COMPANY, a DIVISION OF UNION CARBIDE AND CARBON CORPORATION.

This plant will add a rated capacity of 60,000,000 pounds to the industry's production—more than the entire industry produced in 1950.

"The growing demand for polyethylene," Mr. Miller said, "is the result of expanding requirements throughout the plastics industry. New processing equipment and facilities are keeping pace with greater production."

Seadrift makes the third polyethylene plant that Union Carbide has in operation, and a fourth plant is scheduled to go into operation at Torrance, Calif., in about a year. In addition to the original plant built at South Charleston, W. Va., in 1943 and since expanded to a rated annual capacity of 70,000,000 pounds, a 60,000,000 pound plant at Texas City, Texas, went into operation at the end of 1953.

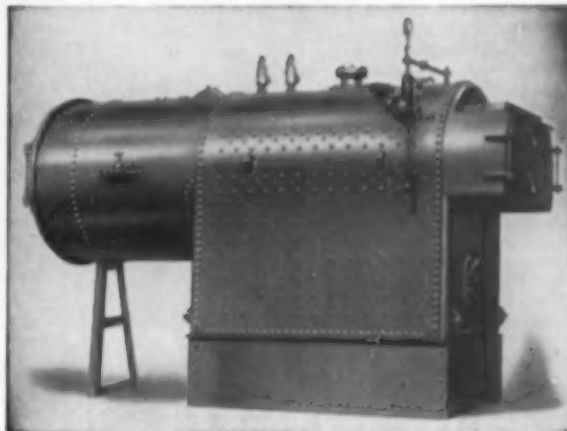
### Conoflow Names Edwards—Ala.

CONOFLOW CORPORATION announces the appointment of GEORGE S. EDWARDS as sales representative in ALABAMA, with headquarters at 2856 South 18th St., Birmingham.

Mr. Edwards received his Bachelor of Science Degree in Chemical Engineering in 1938. He worked for the West Virginia Pulp and Paper Company in their New York laboratories as a development engineer and was

later made Assistant Superintendent of the Tyrone, Pa., Pulp Mill. Following a four year tour in the army, Mr. Edwards joined the Swenson Evaporator Company, a division of the Whiting Corporation, as a design engineer. He later transferred to their Birmingham, Alabama, office as district manager for the Southeastern states. He left Swenson in 1953 to organize his own business as a manufacturers' representative for the industrial process control field.

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## News for the South and Southwest (continued)

### Productivity Forum Held In Jackson, Mississippi

About 150 management representatives from industries in MISSISSIPPI met at Jackson, Miss., April 8 to attend a one-day Industrial Productivity Forum sponsored jointly by the GENERAL ELECTRIC COMPANY and the MISSISSIPPI POWER & LIGHT COMPANY.

The forum, one of a series conducted by G-E and power companies throughout the country, was designed to help solve problems arising from rapidly expanding industry and greatly increased demands for electric power. It featured 10 speakers, each a specialist in a specific field of industrial productivity. Subjects discussed included electric power distribution, factory automation, scheduled maintenance, and research and development.

Rex I. Brown, chairman of the board, Mississippi Power & Light Company, welcomed the industrialists to the forum and delivered the keynote address. Chairman of the morning session was B. M. Davis, the power company's general sales manager. T. R. Brock, G-E's Apparatus sales manager in Jackson, opened the forum.

The first item of business on the one-day forum was a panel presentation on new ideas for increased production by F. W. McChesney, manager, industry sales procedure in G-E's Industrial Division, who has participated in more than 40 productivity forums during the past few years.

R. B. Wilson, president, Mississippi Power & Light Company, closed the session with a summary of results and an outline of power company plans for insuring the western half of Mississippi an abundant supply of electric power to meet the growing demands of industry.

### Sylvania—Kansas City

WILLIAM C. LOUNSBURY, JR., has been appointed sales manager of the KANSAS CITY district by SYLVANIA ELECTRIC PRODUCTS INC.

From 1946 until recently, Mr. Lounsbury served as a field representative for the company's lighting division. Mr. Lounsbury will make his headquarters at 450 Funston Road, Kansas City, Kansas.

### Buchanan Sales Award Goes to Florida Firm

The Sales Award Winners for 1954 were recently announced by BUCHANAN ELECTRICAL PRODUCTS CORPORATION, Hillside, N. J.

Winners in the category of Sales Versus Quota in national competition went to BELCHER & ASSOCIATES, INC., JACKSONVILLE, FLORIDA, whose territory for Buchanan extends throughout Georgia, Alabama and Florida.

### Garlock Elects Sewell

J. B. SEWELL was elected a vice president of THE GARLOCK PACKING COMPANY, Palmyra, New York at a recent meeting of the directors.

Mr. Sewell started with The Garlock Packing Company of Canada, Ltd., in 1935 as a sales representative in the Montreal area, and in 1947 he was elected vice president.

On October 1, 1954 Mr. Sewell was transferred to the United States and appointed general sales manager of the parent company with over-all direction of sales both in Canada and the United States.

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And Outside Diameters  $\frac{1}{8}$ ",  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  
 $\frac{1}{2}$ ",  $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ ".

**MAGNIFYING RED LINE**

## High Pressure Composition ERNST RUBBER GASKETS

All sizes to fit your gages and valves



FIG. 21—Lip Mold

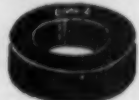


FIG. 22—Standard

**ERNST WATER COLUMN & GAGE CO.**  
Send for Catalog LIVINGSTON, N. J.



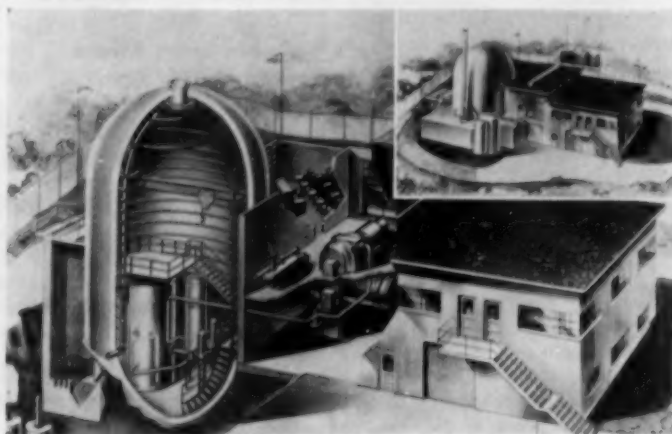
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636 So. Federal Street, Chicago 5

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Peerless Book Form  
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## News for the South and Southwest (continued)



### Prototype of Virginia Atom-Powered Plant

First views approved for publication of the Army Package Power Reactor designed by American Locomotive Company under a contract received from the Atomic Energy Commission in December, 1954, are shown above.

The APPR will be a prototype of the first atom-powered generating

plant built so that its components can be transported by air to remote bases in any part of the world. The U. S. Army's first atomic reactor will be erected at Ft. BELVOIR, VA., headquarters of the Army Corps of Engineers, and should be in operation in about three years. It will probably be the nation's first exportable peaceful application of atomic energy.



R. W. Frank, Ferro safety director (right, center), presents award to Bill Russell (left, center), Nashville, Tennessee, plant superintendent. Other safety committee members, left to right are: Jimmy Arnold, maintenance foreman; Theron Bradley mixing foreman; Horace Niece, Townmotor operator; Tommy Dye, assistant plant superintendent and Jimmy Hazel, shipping foreman.

### Safety Record for Nashville Frit Div.

Two years of operation without a disabling injury is the new safety record established by the NASHVILLE FRIT DIVISION of FERRO CORPORATION in Nashville, Tenn. A certificate of appreciation in recognition of this achievement was recently presented to the employees by R. W. Frank, Ferro Safety Director.

The Nashville Division started winning safety awards in 1951 when they

achieved the best record in Ferro Corporation and were awarded the C. D. Clawson Safety Trophy. In 1953, they were awarded a Perfect Record Plaque by the National Safety Committee and won their first Ferro Certificate of Achievement for a years work without a disabling injury. They are now actively competing in a National Safety Council contest for glass and ceramic industries.

### Westinghouse—Baltimore

A new major expansion by WESTINGHOUSE ELECTRIC CORPORATION near the Friendship Airport, BALTIMORE, MD., was revealed recently when plans for construction of a combined manufacturing plant, engineering, and office building for production of military electronic equipment, were announced.

Site of the proposed Electronics Division structure is adjacent to the Air Arm Division plant on Fort Meade Road. It will comprise a total of 350,000 sq ft of floor space. Plans call for full operation by January 1956.

### Moxley Is Acipco President

THE AMERICAN CAST IRON PIPE COMPANY, of BIRMINGHAM, ALA., has announced the promotions of five key officials.

STEPHEN D. MOXLEY, former executive vice president, has been named president to succeed CHARLES OTTO HODGES who retires after 38 years of continuous service.



Stephen Moxley

Mr. Moxley is widely known for his numerous inventions such as cupola charger and flask handling device, as well as for his many articles in engineering and industrial management journals.

He is former National Vice President of the American Society of Mechanical Engineers and is a member of the Newcomen Society of England and American Foundrymen's Society.

Others who assumed top posts at Acipco were FRANK H. COUPLAND, who becomes vice president and works manager; ARNOLD J. HERRMAN, who was named vice president and sales manager; KENNETH R. DANIEL, vice president and chief engineer, and A. E. BOWEN, treasurer.

All men have long and continuous service with Acipco and rose "through the ranks" to their present positions.

### Pritchard Holds K. C. Annual Sales Meeting

The new Pritchard "Lo-Line" Cooling Tower, designed for roof-top air conditioning installations where a low silhouette is desirable, was introduced to thirty-five sales representatives and district office managers at the recent annual National Sales Meeting of J. F. PRITCHARD & COMPANY, manufacturer of industrial and air conditioning cooling towers, and air and gas dehydration equipment, in KANSAS CITY, MISSOURI.

Those from the Pritchard organization taking part in the sessions were: KARL E. JOHNSON, vice-president and general manager; W. R. ROEYER, sales manager; NEIL W. KELLY, chief research engineer; and P. A. FROHWERK, chief design engineer.

Representatives and district managers from the South and Southwest in attendance were: DON MCRAE, Rittlemeyer and Company, Inc., ATLANTA, GEORGIA; VANCE MORROW, Hoffman and Hoffman Company, GREENSBORO, NORTH CAROLINA; DON LANDRY, Factory Sales, Inc., NEW ORLEANS, LOUISIANA; GEORGE KOUTELAS, J. F. Pritchard and Co., ST. LOUIS,

MISSOURI; R. S. STOVER, WASHINGTON, D. C.; MORLEY HUDSON, Hudson-Rush Co., SHREVEPORT, LA.; JACK RUSH, Hudson-Rush Co., DALLAS, TEXAS; J. LAWRENCE BROWNLEE, Brownlee-Morrow, Inc., BIRMINGHAM, ALABAMA; LOUIS LOEFFLER, JR., Federal Corp., OKLAHOMA CITY, OKLAHOMA; LOUIS B. HOFFMAN, Hoffman and Hoffman Company, GREENSBORO, NORTH CAROLINA; R. E. BRADLEY, J. F. Pritchard and Co., HOUSTON, TEXAS; M. A. TEALE, J. F. Pritchard and Co., TULSA, OKLAHOMA; and W. R. JOHNSON, Federal Corp., OKLAHOMA CITY, OKLAHOMA.

### Goodall Opens Florida Branch

GOODALL RUBBER COMPANY, Trenton, N. J., has announced the opening of a branch office and warehouse in STUART, FLORIDA, under the management of EARL J. RICOU.

Located at 417 South Route A1A, this newest Goodall branch will maintain adequate stocks of contractors' industrial and marine rubber products, including hose, belting, packings, waterproof footwear and clothing.

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# Brothers... INSULATION



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Materials carried to meet all your insulating needs include: Fiberglass coverings and A-E-4 Board, Foamglass pipe coverings and blocks, 85% Magnesia, Mineral Wool, Lion Oil and Laykold weather coat, Foster, Arasol and 3-M adhesives, Kaylo High Temp pipe covering and blocks, asbestos cement, Fiberglass Dust-Stop air filters\*, Foamglass roof insulation\*, new fine fiber low pressure fiberglass pipe covering, and miscellaneous industrial insulation accessories.

\*Available but we do not install

*"Follow the Compass for the Best in Insulation"*

CALL OR WRITE YOUR NEAREST NORTH BROTHERS BRANCH WAREHOUSE FOR OVERNIGHT DELIVERY IF THE INSULATION YOU WANT IS NOT LISTED—WE HAVE THE EQUIVALENT



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Classified rates are set, payable in advance, each month. Rates are based on column inch, with three columns per page, 10 inches per column, column width 2 1/4 inches—a total of 30 column inches per page.

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*Rates quoted on special types of repeated advertisements.*

Special "Position Wanted" Advertisements submitted by individuals seeking employment, 10 cents per word per insertion, payment with order, minimum charge \$1.00. When used, Box Number address, c/o SOUTHERN POWER & INDUSTRY, 808 Peachtree Street, N.E. Atlanta 3, Georgia, count as eight words.

## SAVE \$\$\$\$

By having your Safety-Relief-Gate-Globe-Check Valves rebuilt or serviced by us. Staffed with factory trained personnel we are able to give a new valve guarantee, cut down on tie and freight charges, to all within a 400 mile radius of Jacksonville. Work performed either in your plant or ours. Complete insurance carried. For particulars write:

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**AUTHORIZED REPAIR, MAINTENANCE & SALES FOR THE CROSSBY STEAM GAUGE & VALVE CO. AND THE ASHTON VALVE COMPANY**

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FOR USED TRANSFORMERS

Convert your used transformers to cash! Send us a description of them TODAY. Transformers sold Calls built to your specifications. Send blueprint, for prompt quotation.

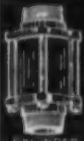
**TRANSFORMERS BOUGHT, SOLD and REPAIRED**  
 40 Years Dependable Service

**THE ELECTRIC SERVICE CO.**


5323 Hetzel St., Cincinnati 27, Ohio

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8 1/4 years' experience in irrigation and water supply systems, building specialties, structural and miscellaneous steel. 18 years' experience mechanical in heavy construction, 3 years of which were in Industrial Automatic Controls. Will consider sale of products to industry, distributors or retailers—prefer to locate in Southeastern seaboard area. Write Box 232, c/o SOUTHERN POWER & INDUSTRY, 808 Peachtree St., N.E., Atlanta, Ga.



**FLOW INDICATORS**  
 All sizes up to 6"  
 SEND FOR CATALOG  
**ERNST**  
 Water Column & Gage Co.  
 LIVINGSTON, N. J.



## DIXIE ENGINEERING COMPANY

"Manufacturer's Agents"

P. O. Box 758 812-813 Protective Life Building  
 BIRMINGHAM 3, ALABAMA  
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## POSITION WANTED

In South or Southwest, Registered Professional Engineer with experience in plant layout, Production Expediting, Management and Public Relations, also Municipal Government and Utilities. Age 54, sober and reliable, salary commensurate with responsibility. Available on 15 day notice. Write Box 353, SOUTHERN POWER AND INDUSTRY, 808 Peachtree St., N.E., Atlanta 3, Georgia.

## "ELECTRICITY AND ELECTRICAL POWER"

*Basic information on the fundamentals of electricity for the first time available in ONE Volume!*

A limited edition of this important handbook has just been printed and is available to subscribers to SOUTHERN POWER AND INDUSTRY only. Order your copy NOW with a new or renewal subscription to this magazine.

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ALL GASOLINE POWERED  
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SOUTHERN POWER & INDUSTRY for MAY, 1955



So SIMPLE  
We Can  
Adapt It  
to ANY  
LIQUID LEVEL  
CONTROL JOB

A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

## MAGNETROL

AS DEPENDABLE AS MAGNETIC FORCE ITSELF

● No matter how specialized the liquid level control application, adapting Magnetrol to meet it presents no problem. Whether it's for high pressures, high temperatures, corrosive liquids or any other condition, a few "standard" modifications and the job is done! Operation is so simple no changes in basic design are needed. That's why Magnetrol "fits" practically any application — why "specials" are so often standard with us.

Because of the utter simplicity and dependability of its magnetic principle, Magnetrol has infinite operating life. There are no wearing parts to get out of order.

Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

**MAGNETROL, Inc.**

WHY NOT MAIL THE COUPON — NOW

MAGNETROL, Inc., 2718 S. Marshall Blvd., Chicago 23, Illinois

Please send me catalog data and full information on

Magnetrol Liquid Level Controls.

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Company   
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**V-BELT**  
**QUIZ** for  
Maintenance  
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Take an extra minute to follow the proper steps in installing belts and performance time can be increased by many years. 1. Loosen motor or driven unit. 2. Install belts. 3. Tighten drive. 4. Check alignment of sheaves. 5. Make sure shafts are parallel. 6. Adjust tension again after 24 hours operation. (Sales plug: Ask your D-A distributor for more tips on getting better production and longer life from your V-drives).

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ATWOOD  
V-BELTS**

**avoid climbing**

**keep your feet on the ground  
with remotely adjusted  
reducing valves**

**saves time**



Control those inaccessible Pressure Reducing Valves from any location you wish!

A LESLIE Air Loading Panel, Type ARP-1 and remotely adjusted reducing valve eliminates dangerous ladders, wasted time and costly overheating.

Most LESLIE manually adjusted Reducing Valves now in service can be converted quickly and economically in the field for remote adjustment.

Send for Bulletin 5302, for complete story.



## AIR LOADING PANELS

LESLIE CO., 261 Grant Avenue, Lyndhurst, New Jersey



For  
Intermediate and  
High Pressure Gas

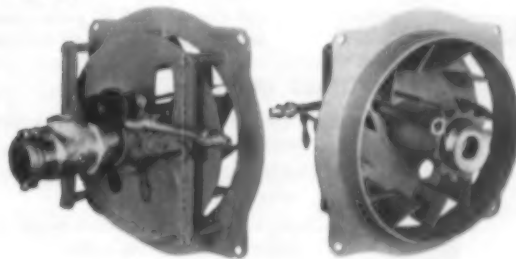
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Now available after almost three years of operating tests and installations having capacity of 1,242,000,000 Btu/hr. at 10 psig.

This unique application of the *Venturi* principle has resulted in a high input burner that can be installed through very narrow rectangular furnace openings.

It is recommended for inter-tube firing; firing in a horizontal plane through small openings over coal grates; firing in a vertical plane on either side or on a horizontal plane over a stoker or oil burner; and also for use in all types drying kilns.

It is small in size, and light in weight, with excellent turn-down without flash back; stable flame retention even at high inputs—low noise level.



## WEBSTER SERIES "R" Gas Burner

For High Pressure Gas with Combination Oil

When high pressure gas is available the 5 sizes of Series R Burners provide inputs from 2,000,000 Btu/hr/burner at 1 psi to 50,000,000 Btu/hr/burner at 10 psi.

There are practically no limits to the possible uses of the Series R assemblies except those imposed by the gas pressure available. It is most widely applied to high pressure boilers of 100 hp and above, steam generators of all types and refinery furnaces.

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The WEBSTER ENGINEERING COMPANY

TULSA, OKLAHOMA

Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio



FOR BETTER VALVE AND  
UNION PERFORMANCE:

# FAIRBANKS

## All Star Team

An unbeatable combination — the "first string" team of valve and union for dependable trouble-free piping installations.

### Look at the lineup:

#### U-01 BRONZE GLOBE VALVE

##### ★ Renewable Composition Disc

Perfect sealing at all times—

A disc for every type of service—

#50—a hard disc for general usage

#52—a rubber disc for cold water valves

#60—a special synthetic disc highly resistant to gasoline, oils and many acids and alkalis.

##### ★ Two Piece Union Bonnet

—Quick, easy disassembly

—No sliding or scraping between body and bonnet—NO WEAR

##### ★ Radial Seat of Two Piece Union Bonnet

—Leak-proof Body Bonnet Joint

—Rigid alignment of all parts—guaranteed perfect seating all the time.



#### DART UNION

★ Ground Ball Joint having extra wide seating surfaces

★ Two Bronze Seats, non-corroding, on both sides of the seat

★ Leak-proof without excessive torque because of true bearing surfaces

★ High-test air-refined malleable iron body will not stretch, practically unbreakable.

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COMPANY

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Pressure vessels fabricated by FINNIGAN are built to rigid ASME Codes! Over 65 years of plate fabrications have given FINNIGAN Engineers and Craftsmen the know-how to build the finest of equipment. That's why the FINNIGAN guarantee can specify that equipment by FINNIGAN is equal to or better than that of any other manufacturer!

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3714 14th ST. N.W. WASHINGTON D.C.



## RIGHT AT THE SOURCE OF WASTE

For this 15 hp motor, power losses are corrected where it does the most good—at the source. A 4 kvar Sprague Power Factor Correction Capacitor across the terminals reduced reactive circuit current flow through transformers and wiring to a bare minimum... slashed power bills noticeably.

Sprague Unit-Cell Capacitors make it unnecessary to buy even one kvar more than you need. Write for the Sprague free guide of cost-saving suggestions, No. 50B.

**SPRAGUE**

PIONEERS IN

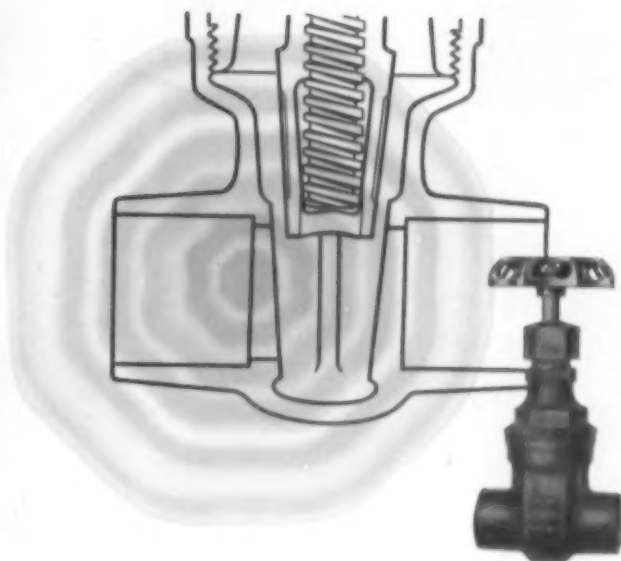
SPRAGUE ELECTRIC COMPANY  
49 MARSHALL ST., NORTH ADAMS, MASS.

ELECTRIC AND ELECTRONIC DEVELOPMENT





# When the heat's on you need the extra strength of **JENKINS** Solder and Socket End **VALVES**



## Solder End GLOBES and ANGLES

300 lbs. O.W.G.  
1/4" to 3"

Fitted with Renewable  
Composition Disc.



## Solder End GATES

225 lb. and  
300 lb. O.W.G.  
3/4" to 3"

With solid or split  
wedges, and station-  
ary or traveling  
spindles.



## Solder End CHECKS

300 lbs. O.W.G.  
1/4" to 3"

Regrinding. May be  
easily reground with-  
out removal from line.



The "light-duty" look of copper tubing installations is deceiving. Valves must provide an accurate fit to tubing and *hold it* under the intense heat of soldering. And, because flexible tubing does not afford the rigid support of standard pipe, valves must withstand unusual strains in operation.

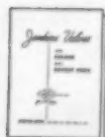
Jenkins Solder End Valves are engineered to meet these demands with strength to spare. High tensile bronze castings have liberal dimensions for extra rigidity. Smooth, clean bores assure accurate fit, easy soldering, positive seal to types K, L, and M Copper Tubing.

For faster, trouble-free installation, and lasting economy, specify Jenkins Solder End Valves. Jenkins Bros., 100 Park Ave., New York 17.

## JENKINS Socket End Valves for Class B or IPS Tubing



Jenkins bronze valves with socket ends for silver-brazing are made in Globe, Gate, and Swing Check patterns to control compressed air, hot oil, and similar fluids in tubing hookups where specifications call for permanent, leakproof joints. Complete information in the Bulletin offered below.



**NEW BULLETIN** Lists all Jenkins Solder End and Socket End Valves and gives complete instructions for soldering and brazing. Ask for Solder-Socket End booklet.

# JENKINS

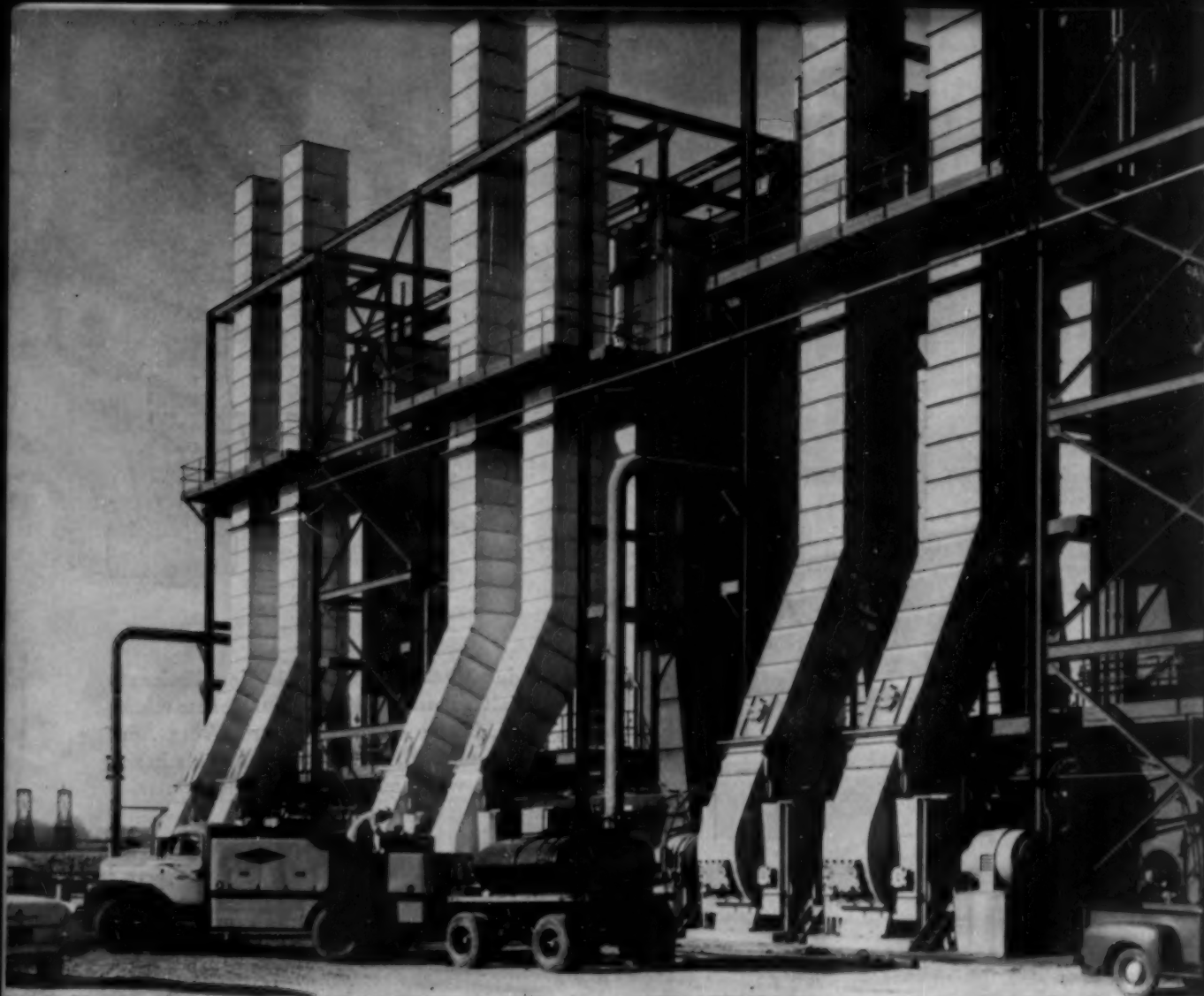
EDGE FOR THE JENKINS DESIGN

# VALVES



*Jenkins Bros.*

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS



## BOILER TUBE FAILURES ELIMINATED

**Regular program of DOWELL chemical cleaning for six boilers ended tube failures due to scale**

The tubes of a 500,000 pph boiler in a chemical plant contained an extremely hard high-silicate scale up to  $\frac{1}{16}$ -inch thick. Mechanical cleaning was unsatisfactory, because it required a long shutdown and still left hard scale in the tubes.

Dowell engineers formulated a special solvent and quickly removed the scale from the boiler. The operator now has all six of the 500,000 pph boilers on a regular schedule of Dowell chemical cleaning. Since the beginning of this program, the boilers have been cleaned several times and there have been no tube failures caused by scale deposits.

Chemical cleaning is designed to add years of life to your equipment by helping to protect it from over-heating, galvanic attack, and pitting-type corrosion. Downtime is held to a minimum, because solvents are introduced through regular connections . . . extensive dismantling and scaffolding are not needed.

Dowell Service brings you over a decade of experience in the chemical cleaning of many kinds of equipment, including more than 10,000 high- and low-pressure boilers. Contact the nearest Dowell office for more information. Or write Dowell Incorporated, Tulsa 1, Oklahoma, Dept. E-26.

*chemical cleaning service for industry*

**DOWELL**

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